Unit One

Fractions

1 Approximating to the nearest hundredth and thousandth.
2 Comparing and ordering fractions.
3 Multiplying decimals by 10 , 100 and 1000
4 Multiplying decimals - Multiplying a decimal number by a whole number.
5 Multiplying fractions.
• Test on the first part of unit one.
6 Dividing fractions.
7 Dividing decimals by 10 , 100 and 1000
8 Dividing a whole number by a 3-digit number without having a remainder.
9 Dividing by a decimal.
10 Infinite division.
• Test on the second part of unit one.

Unit Aims

By the end of this unit, student should be able to :

- approximate the number to the nearest hundredth and thousandth.
- compare two fractions of the same denominator.
- compare two fractions of the same numerator.
- compare two fractions of different numerators and denominators.
- arrange a set of fractions ascendingly and descendingly.
- multiply decimals by 10 , 100 and 1000
- multiply two decimals by each other.
- multiply a decimal number by a whole number.
- multiply two fractions by each other.
- multiply a fraction by a whole number.
- multiply a fraction by a mixed number.
- divide a fraction by another fraction.
- divide decimals by 10 , 100 and 1000
- divide a whole number by a 3-digit number without having a remainder.
- divide by a decimal.
- convert a fraction to decimal.
- recognize the infinite division.

Lesson 1 Approximating to the nearest hundredth and thousandth

Approximating (or rounding) means to express a number to the nearest given place.

- **Approximating** makes numbers easier to work with.

For Example : If the price of a book is L.E. 35.85, it is easier to say that it is approximately L.E. 36 (About L.E. 36)

35.85

35 — 36

Approximating to 36

- Also **approximating** allows you to estimate more easily the results of operations.

For Example : To estimate the sum of 98 and 51, you can approximate 98 to 100, and 51 to 50, then the estimated sum will be 150, which means that 98 + 51 is about equal to 150







First Approximating to the nearest hundredth "2 decimal places"

Approximating to the nearest hundredth means that the result of approximating include only 2 decimal digits.

To approximate to the nearest hundredth (0.01 or $\frac{1}{100}$), do as follows :



Look at the digit written at the thousandth's place

IF

This digit is

Less than 5

Leave out the digit at the thousandth's place and the other digits to the right.

For Example :

$7.5\underline{3}46 \simeq 7.53$

$28.3\underline{4}2 \simeq 28.34$

Equal to 5 or more

Increase the digit at the hundredth's place by one, and leave out other digits to the right.

For Example :

$27.1\underline{2}71 \simeq 27.13$

$4.5\underline{7}5 \simeq 4.58$

Example (1)

Approximate each of the following numbers to the nearest hundredth :

[a] 14.523 | [b] 5.9184 | [c] 0.705 | [d] 25.796

[e] 36.997 | [f] 0.995 | [g] $\frac{14}{1000}$ | [h] $2\frac{13}{200}$

Solution

[a] $14.5\underline{2}3 \simeq 14.52$ ($3 < 5$)

[b] $5.9\underline{1}84 \simeq 5.92$ ($8 > 5$)

[c] $0.7\underline{0}5 \simeq 0.71$ ($= 5$)

[d] $25.7\underline{9}6 \simeq 25.80$ ($6 > 5$)

[e] $36.9\underline{9}7 \simeq 37.00$ ($7 > 5$)

[f] $0.9\underline{9}5 \simeq 1.00$ ($= 5$)

Notice

When approximating to the nearest hundredth, the result should include 2 decimal digits even if the digit at the hundredth's place equals 0, as in [d], [e] & [f]



[g] $\frac{14}{1000} = 0.014 \simeq 0.01$ (4 < 5)

[h] $2\frac{13}{200} = 2\frac{13 \times 5}{200 \times 5} = 2\frac{65}{1000} = 2.065 \simeq 2.07$ (= 5)

Notice

You should convert the fraction or the mixed number to a decimal before approximating , as in [g] & [h]

Example (2)

Find the result of each of the following , then approximate it to the nearest hundredth :

[a] $5432 \div 1000$

[b] $15.358 + 12.57$

[c] $58.528 - 17.0524$

[d] $7\frac{3}{4} - 5\frac{19}{500}$

Solution

[a] $5432 \div 1000 = 5.432 \simeq 5.43$

[b] $15.358 + 12.570 = 27.928 \simeq 27.93$

[c] $58.5280 - 17.0524 = 41.4756 \simeq 41.48$

[d] $7\frac{3}{4} - 5\frac{19}{500} = 7\frac{3 \times 25}{4 \times 25} - 5\frac{19 \times 2}{500 \times 2} = 7\frac{75}{100} - 5\frac{38}{1000}$

$= 7.75 - 5.038 = 7.750 - 5.038 = 2.712 \simeq 2.71$

Try by yourself

- **Approximate each of the following to the nearest hundredth :**

[a] $55.524 \simeq$ ....

[b] $35.1072 \simeq$ ....

[c] $1.595 \simeq$ ....

[d] $\frac{57}{1000} \simeq$ ....

- **Find each of the following to the nearest hundredth :**

[a] $5.542 + 3.75$

[b] $15.265 - 3.157$

Second Approximating to the nearest thousandth "3 decimal places"

Approximating to the nearest thousandth means that the result of approximating include only 3 decimal digits.

To approximate to the nearest thousandth (0.001 or $\frac{1}{1000}$) , do as follows :

Look at the digit written at the ten thousandth's place

IF

This digit is



Less than 5

Leave out the digit at the ten thousandth's place and the other digits to the right.

For Example :

73.3421 ≃ 73.342
25.7654 ≃ 25.765

Equal to 5 or more

Increase the digit at the thousandth's place by one, and leave out other digits to the right.

For Example :

57.2408 ≃ 57.241
112.2135 ≃ 112.214

Example 3

Approximate each of the following numbers to the nearest thousandth :

[a] 3.6452
[b] 12.5928
[c] 2.4355
[d] 0.6697
[e] $135 \frac{1286}{10000}$

Solution

[a] 3.6452 ≃ 3.645 (2 < 5)

[b] 12.5928 ≃ 12.593 (8 > 5)

[c] 2.4355 ≃ 2.436 (= 5)

[d] 0.6697 ≃ 0.670 (7 > 5)

[e] $135 \frac{1286}{10000}$ = 135.1286 ≃ 135.129 (6 > 5)

Notice

When approximating to the nearest thousandth, the result should include 3 decimal digits.







Try *by yourself*

- **Approximate each of the following to the nearest thousandth :**

[a] 8.1437 ≃ ....

[b] 31.2345 ≃ ....

[c] 1.5698 ≃ ....

[d] $\frac{2434}{10000} \simeq$ ....

Example (4)

[1] Write down the smallest decimal fraction that includes only the digits 3 , 6 , 4 and 2 , then approximate that number to the nearest hundredth and the nearest thousandth.

[2] Write down the greatest decimal fraction, that includes 4 digits which are 5 , 9 , 2 and 7 , then approximate that number to the nearest hundredth and the nearest thousandth.

Solution

[1] To write the smallest decimal fraction , put the decimal point (0.) , then write the given digits arranged ascendingly from the left to the right , then :

The smallest decimal fraction = 0.2346

- $0.2\underline{3}46 \simeq 0.23$ (to the nearest hundredth)
- $0.23\underline{4}6 \simeq 0.235$ (to the nearest thousandth)

[2] To write the greatest decimal fraction , put the decimal point (0.) , then write the given digits arranged descendingly from the left to the right , then :

The greatest decimal fraction = 0.9752

- $0.9\underline{7}52 \simeq 0.98$ (to the nearest hundredth)
- $0.97\underline{5}2 \simeq 0.975$ (to the nearest thousandth)



Estimation

In our daily life , sometimes we use approximation to estimate the result of a mathematical operation.

For Example :

If you approximate the prices of item of a shopping list, you can easily add (even in your head) the approximated prices and then compare it with the given total.

Example (5)

Bassem bought some stuff from a shopping centre.

Price	Item	Price	Item	Price	Item
L.E. 94.75	Meat	L.E. 56.25	Chicken	L.E.15.25	Vegetables
L.E. 22.5	Fruits	L.E. 15.75	Soap	L.E.150.25	Clothes

- **Approximate** the price of each item to the nearest L.E. and then **estimate** the value of the total which must be paid.
- **Compare** your **estimation** and **the total** given in the receipt.
- **What can you say ?**

Solution

Estimation

- $94.75 \simeq 95$
- $56.25 \simeq 56$
- $15.25 \simeq 15$
- $22.5 \simeq 23$
- $15.75 \simeq 16$
- $150.25 \simeq 150$

- The estimation of the total which must be paid
  $= 95 + 56 + 15 + 23 + 16 + 150 =$ L.E. 355
- The total of the receipt
  $= 94.75 + 56.25 + 15.25 + 22.5 + 15.75 + 150.25 =$ L.E. 354.75

If we compare the estimated total and the total of the receipt , we find that they are very closed (almost the same) $(354.75 \simeq 355)$



Example 6

Given that : L = 32.3562 and M = 53.8295 , estimate the sum of L + M , then compare your estimation with the sum to the nearest hundredth.

Solution

Estimation

Estimate of L = 32 Estimate of M = 54

Estimate of (L + M) = 32 + 54 = 86

L = 32.3562 , M = 53.8295

L + M = 32.3562 + 53.8295 = 86.1857 ≃ 86.19 (to the nearest hundredth)

Since the actual sum is closer to estimate ,

then the estimation is acceptable.



- **Given that : X = 54.2571 and Y = 15.8905 , estimate the sum of X + Y , then compare your estimation with the sum to the nearest thousandth.**

Exercise 1 Approximating to the nearest hundredth and thousandth

From the school book

1 Approximate each of the following numbers to the nearest hundredth :

a 📖 76.514 ≃ ....

b 📖 52.608 ≃ ....

c 📖 175.325 ≃ ....

d 21.8253 ≃ ....

e 52.1248 ≃ ....

f 📖 0.737 ≃ ....

g 23.297 ≃ ....

h 0.996 ≃ ....

i 0.002 ≃ ....

j $\frac{5685}{1000}$ ≃ ....

k $\frac{25698}{10000}$ ≃ ....

l $2\frac{1}{8}$ ≃ ....

m $39\frac{3}{1000}$ ≃ ....

n 📖 $3\frac{17}{500}$ ≃ ....

o $31\frac{9}{250}$ ≃ ....

p $6\frac{43}{200}$ ≃ ....

2 Approximate each of the following numbers to the nearest thousandth :

a 41.6247 ≃ ....

b 2.0509 ≃ ....

c 0.0474 ≃ ....

d 144.1015 ≃ ....

e 📖 4.6798 ≃ ....

f 19.9996 ≃ ....

g 0.0004 ≃ ....

h 0.9986 ≃ ....

i $16\frac{27}{10000}$ ≃ ....

j $\frac{86479}{10000}$ ≃ ....

k $94\frac{129}{10000}$ ≃ ....

l $8\frac{8}{5000}$ ≃ ....

3 Approximate 4.7398 to the nearest :

a hundredth.   b thousandth.

4 Complete the following table with suitable numbers as in (a) :

	Number	The number approximated to the nearest			
		Unit	Tenth	Hundredth	Thousandth
a	123.3569	123	123.4	123.36	123.357
b	528.2025	....	....	....	....
c	537.2983	....	....	....	....
d	43.5426	....	....	....	....
e	21.84792	....	....	....	....
f	0.5297	....	....	....	....
g	0.0082	....	....	....	....
h	$\frac{3}{8}$	....	....	....	....

5 Choose the correct answer :

a 5.345 ≃ .... "to the nearest hundredth"
(5.346 *or* 5.35 *or* 5 *or* 5.3)

b 2.5786 ≃ .... "to the nearest $\frac{1}{1000}$ "
(2.579 *or* 2.58 *or* 2.578 *or* 2.576)

c 371.456 ≃ .... "to the nearest 100"
(371.46 *or* 400 *or* 300 *or* 371.5)

d 17.947 ≃ .... "to the nearest 2 decimal places"
(17.948 *or* 17.95 *or* 17.90 *or* 17.94)

e 736.592 ≃ 736.59 to the nearest ....
(unit *or* tenth *or* hundredth *or* thousandth)



f 82.497 ≃ 82.50 to the nearest ....
(unit *or* tenth *or* hundredth *or* thousandth)

g 152.23 ≃ 150 to the nearest ....
(hundredth *or* unit *or* ten *or* tenth)

h 4.559 ≃ 4.6 to the nearest ....
(unit *or* ten *or* tenth *or* hundredth)

i 73.7694 ≃ 73.77 to the nearest ....
(thousandth *or* hundredth *or* tenth *or* unit)

j $3\frac{1}{8}$ ≃ .... "to the nearest hundredth" (3.10 *or* 3.12 *or* 3.13)

k 8657 cm. ≃ .... m. "to the nearest metre"
(8.6 *or* 86 *or* 87 *or* 8.66)

l 7004 mL. ≃ .... L."to the nearest litre"
(70.04 *or* 7.004 *or* 7 *or* 8)

6 Find the result of each of the following operations, then approximate it to required approximation :

a 2.253 + 12.564 = ... ≃ .... (to the nearest $\frac{1}{100}$)

b 65.384 + 63.427 = ... ≃ .... (to the nearest hundredth)

c 37.4289 – 14.081 = ... ≃ .... (to the nearest thousandth)

d 13.376 + 15.75 = ... ≃ .... (to the nearest 2 decimal places)

e 729.72 – 122.743 = ... ≃ .... (to the nearest hundredth)

f 42.5667 – 25.36 = ... ≃ .... (to the nearest $\frac{1}{1000}$)

g 4357 ÷ 1000 = ... ≃ .... (to the nearest hundredth)

h 251.76 – $38\frac{1}{8}$ = ... ≃ .... (to the nearest 0.01)

i $17\frac{3}{4}$ + 71.0075 = ... ≃ .... (to the nearest thousandth)

j 10 – 3.5116 = ... ≃ .... (to the nearest thousandth)

k $3\frac{3}{4} - 1\frac{3}{200} = \dots\dots \simeq \dots\dots$ (to the nearest hundredth)

l The difference between $\frac{41}{500}$, 0.473 = ... ≃ ....

(to the nearest tenth)

7 **Discover directly the error in each approximated result to the nearest hundredth, give reason :**

a $73.625 \simeq 73.62$

b $200.081 \simeq 200.07$

c $2.222 + 5.555 \simeq 8$

d $762.3 - 267.212 \simeq 495.089$

8 Write down the smallest decimal fraction that includes the digits (2 , 5 , 7 , 8) , then approximate that number to the nearest hundredth and nearest thousandth.

9 Write the greatest decimal fraction which consists of 6 , 4 , 3 and 5 , then approximate it to the nearest $\frac{1}{10}$ and $\frac{1}{100}$

10 Write the smallest decimal fraction which consists of 2 , 5 , 0 and 7 , then approximate it to the nearest $\frac{1}{100}$ and $\frac{1}{1000}$

11 Write three numbers , if we approximate each of them to the nearest hundredth becomes 12.25

12 Write three numbers , if we approximate each of them to the nearest thousandth becomes 86.398

13 Given that : X = 13.452 , Y = 7.273

Find X + Y approximating the sum to the nearest hundredth.

Estimate the sum of X + Y

Is your estimation acceptable ? Explain.

14 Given that : L = 62.3724 , M = 32.7285

Estimate the sum of L + M , then compare your estimation with the sum to the nearest thousandth.



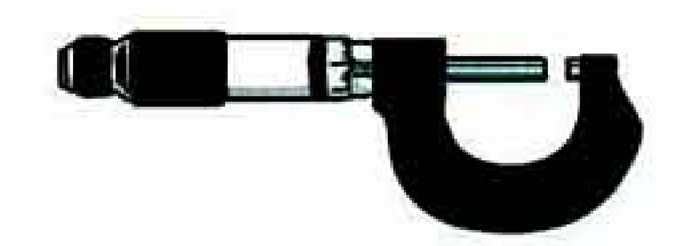


Word Problems

15 Complete :



a The capacity of a cola bottle
= 0.192 liters ≃ .... liters
(to the nearest hundredth)



b A micrometer is a device used for precise measuring. It is used to measure the thickness of a paper and it was 0.136 mm.
The thickness of the paper ≃ .... mm.
(to the nearest hundredth)



c The length of a cell measured by a microscope = 0.3527 mm. ≃ .... mm.
(to the nearest thousandth)



d Each tablet contains some ingredients as shown in the following table :

Compound	Weight in (gm.)	Weight approximated to the nearest thousandth
A	0.0032	....
B	0.0546	....
C	0.1379	....



16 Ahmed bought some stuff from a shopping center. Can you estimate the total of what he paid in L.E. approximating it to the nearest ten pounds ?
Make sure that your estimation is acceptable for the actual sum.

Reciept	
Price (L.E.)	**Item**
15.25	Soap
68.75	Washing powder
64.75	Perfumes
98.25	Meat
170.5	Clothes
28.25	Vegetables



17 A road extends for 74389 metres.
Find its length in kilometres approximating the result to the nearest hundredth.



18 Two pieces of cloth of length 285.95 m. and 382.275 m. Find the sum of the lengths of the two pieces approximating the result to the nearest $\frac{1}{100}$



19 A trader had 20 kg. of cheese. If he sold 10.25 kg. in the first day and 5.355 kg. in the next day.
How many kilograms were left with him approximating the result to the nearest hundredth ?







20 Complete with suitable digits :

a 2.7 ☐ 8 ≃ 2.79 (to the nearest hundredth)

b 20.12 ☐ 6 ≃ 20.123 (to the nearest thousandth)

c 9.2 ☐ ☐ 6 ≃ 9.237 (to the nearest thousandth)

d 19. ☐ ☐ 5 ≃ 20.00 (to the nearest hundredth)

Lesson 2 Comparing and ordering fractions

First Comparing two fractions of the same denominator

- The coloured part represents $\frac{3}{5}$

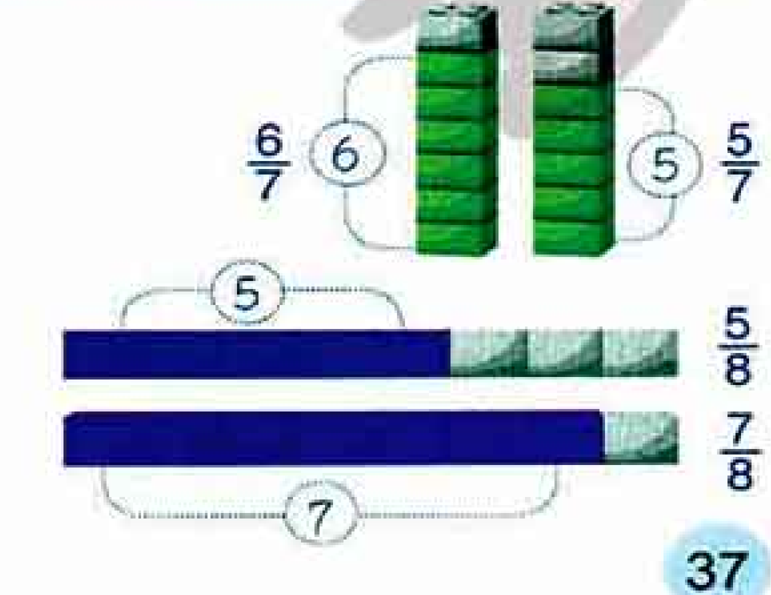
- The coloured part represents $\frac{2}{5}$

It is clear that : $\frac{3}{5} > \frac{2}{5}$

To compare any two fractions having the same denominator, compare their numerators, where the fraction with the greater numerator is greater than the other fraction.

For Example :

- $\frac{6}{7} > \frac{5}{7}$ Because ($\frac{6}{7}$ and $\frac{5}{7}$ are two fractions having the same denominator 7 , and $6 > 5$)
- $\frac{5}{8} < \frac{7}{8}$ Because ($\frac{5}{8}$ and $\frac{7}{8}$ are two fractions having the same denominator 8 , and $5 < 7$)

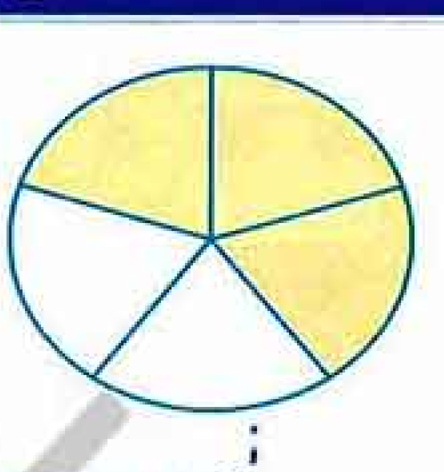






Second Comparing two fractions of the same numerator

The coloured part represents $\frac{3}{5}$



The coloured part represents $\frac{3}{8}$

It is clear that : $\frac{3}{5} > \frac{3}{8}$

To compare any two fractions having the same numerator, compare their denominators , where the fraction with the smaller denominator is greater than the other fraction.

For Example :

- $\frac{4}{5} > \frac{4}{7}$

Because ($\frac{4}{5}$ and $\frac{4}{7}$ are two fractions having the same numerator 4 , and $5 < 7$)

- $\frac{5}{8} < \frac{5}{6}$

Because ($\frac{5}{8}$ and $\frac{5}{6}$ are two fractions having the same numerator 5 , and $6 < 8$)

Example 1

Arrange each of the following fractions in an ascending order :

[a] $\frac{12}{13}$, $\frac{1}{13}$, $\frac{15}{13}$, $\frac{9}{13}$ and $\frac{2}{13}$ [b] $\frac{4}{17}$, $\frac{4}{3}$, $\frac{4}{19}$, $\frac{4}{11}$ and $\frac{4}{7}$

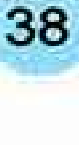
Solution

[a] The fractions having the same denominator.

So , $\frac{1}{13} < \frac{2}{13} < \frac{9}{13} < \frac{12}{13} < \frac{15}{13}$ (because : $1 < 2 < 9 < 12 < 15$)

[b] The fractions having the same numerator.

So , $\frac{4}{19} < \frac{4}{17} < \frac{4}{11} < \frac{4}{7} < \frac{4}{3}$ (because : $19 > 17 > 11 > 7 > 3$)







Try by yourself

- **Put (>) or (<) :**

[a] $\frac{5}{9}$ ☐ $\frac{2}{9}$

[b] $\frac{3}{10}$ ☐ $\frac{3}{7}$

[c] $\frac{2}{11}$ ☐ $\frac{2}{15}$

[d] $\frac{5}{6}$ ☐ $\frac{4}{6}$

Example 2

Find all possible values of x which satisfy each of the following relations , where x is a whole number :

[a] $\frac{4}{9} < \frac{x}{9} < \frac{7}{9}$

[b] $\frac{2}{7} < \frac{2}{x} < \frac{2}{3}$

[c] $1 > \frac{x}{8} > \frac{5}{8}$

[d] $\frac{2}{7} < \frac{2}{x} < 1$

Solution

[a] The fractions having the same denominator.

So , $4 < x < 7$

i.e. x is a whole number between 4 and 7 , then : x equals 5 or 6

[b] The fractions having the same numerator.

So , $7 > x > 3$

i.e. x is a whole number between 3 and 7 , then : x equals 4 , 5 or 6

[c] We write 1 as $\frac{8}{8}$ to have the same denominator

i.e. $\frac{8}{8} > \frac{x}{8} > \frac{5}{8}$

So, $8 > x > 5$, then : x equals 6 or 7



Remember that :

$1 = \frac{1}{1} = \frac{2}{2} = \frac{3}{3} = \frac{4}{4} = \dots$

[d] We write 1 as $\frac{2}{2}$ to have the same numerator.

i.e. $\frac{2}{7} < \frac{2}{x} < \frac{2}{2}$

So, $7 > x > 2$, then : x equals 3 , 4 , 5 or 6



Third Comparing two fractions of different numerators and denominators

The coloured part represents $\frac{3}{4}$

The coloured part represents $\frac{2}{3}$

Now, which is greater $\frac{3}{4}$ or $\frac{2}{3}$?

To answer this question, we divide each previous figure into 12 small squares as follows :

The coloured part represents $\frac{3}{4}$ which is $\frac{9}{12}$

The coloured part represents $\frac{2}{3}$ which is $\frac{8}{12}$

It is clear that : $\frac{9}{12} > \frac{8}{12}$ So, $\frac{3}{4} > \frac{2}{3}$



To compare two fractions of different numerators and denominators, do as follows :

1. **Put** each of the two fractions in its simplest form if it isn't.
2. **If** the numerators or the denominators of the two fractions after simplifying are equal, then compare between them as we have studied before.
3. **If** the numerators and the denominators of the two fractions are not equal, then express the two fractions by two other equal fractions with least common denominator L.C.D. by using L.C.M. of the two denominators.
4. **Compare** the two new fractions.



Example (3)

Compare using (>) or (<) :

[a] $\frac{3}{4}$ ☐ $\frac{5}{6}$

[b] $\frac{10}{24}$ ☐ $\frac{14}{18}$

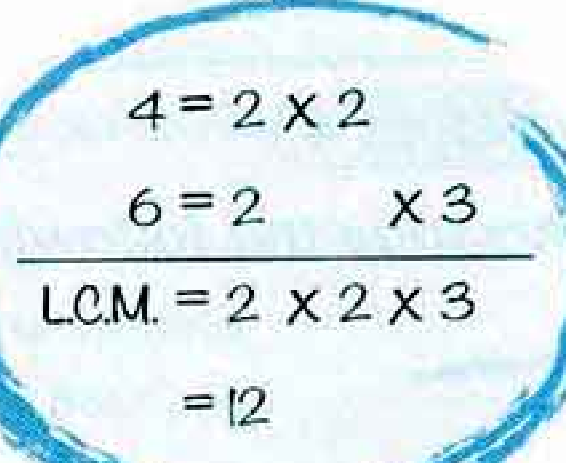
[c] $2\frac{2}{3}$ ☐ $\frac{7}{5}$

[d] $\frac{4}{5}$ ☐ 1

Solution

[a] The L.C.M. of 4 and 6 is 12

i.e. L.C.D. of 4 and 6 is 12



Then , $\frac{3}{4} = \frac{3 \times 3}{4 \times 3} = \frac{9}{12}$, $\frac{5}{6} = \frac{5 \times 2}{6 \times 2} = \frac{10}{12}$

Since , $\frac{9}{12} < \frac{10}{12}$ Therefore , $\frac{3}{4} < \frac{5}{6}$

[b] $\frac{10}{24} = \frac{10 \div 2}{24 \div 2} = \frac{5}{12}$ ($\frac{5}{12}$ is the simplest form of $\frac{10}{24}$)

, $\frac{14}{18} = \frac{14 \div 2}{18 \div 2} = \frac{7}{9}$ ($\frac{7}{9}$ is the simplest form of $\frac{14}{18}$)

The L.C.M. of 12 and 9 is 36

12 = 2 x 2 x 3
9 = 3 x 3
L.C.M. = 2 x 2 x 3 x 3
= 36

Then , $\frac{5}{12} = \frac{5 \times 3}{12 \times 3} = \frac{15}{36}$

and $\frac{7}{9} = \frac{7 \times 4}{9 \times 4} = \frac{28}{36}$

Since , $\frac{15}{36} < \frac{28}{36}$ Therefore , $\frac{10}{24} < \frac{14}{18}$

[c] $2\frac{2}{3} = \frac{8}{3}$

i.e. we want to compare $\frac{8}{3}$ and $\frac{7}{5}$

The L.C.D. of 3 and 5 is 15

Then , $\frac{8}{3} = \frac{8 \times 5}{3 \times 5} = \frac{40}{15}$, $\frac{7}{5} = \frac{7 \times 3}{5 \times 3} = \frac{21}{15}$

Since , $\frac{40}{15} > \frac{21}{15}$ Therefore , $\frac{8}{3} > \frac{7}{5}$ ***i.e.*** $2\frac{2}{3} > \frac{7}{5}$

[d] Since , $1 = \frac{5}{5}$ and $\frac{4}{5} < \frac{5}{5}$ Therefore , $\frac{4}{5} < 1$





Remarks

1. Any **proper** fraction is **smaller than 1** , for example : $\frac{2}{3} < 1$
2. Any **improper** fraction is **greater than or equal to 1** , for example : $\frac{7}{4} > 1$
3. Any **improper** fraction **is greater than any proper fraction**, for example : $\frac{11}{5} > \frac{5}{6}$

Example 4

Arrange the following fractions in a descending order :

$$\frac{7}{12} , \frac{5}{6} , \frac{7}{8} \text{ and } \frac{2}{3}$$

Solution

12 = 2 × 2 × 3
6 = 2 × 3
8 = 2 × 2 × 2
3 = 3
L.C.M. = 2 × 2 × 2 × 3
= 24

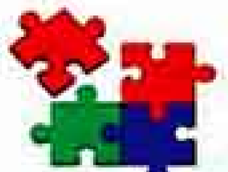
$\frac{7}{12} = \frac{7 \times 2}{12 \times 2} = \frac{14}{24}$, $\frac{5}{6} = \frac{5 \times 4}{6 \times 4} = \frac{20}{24}$

, $\frac{7}{8} = \frac{7 \times 3}{8 \times 3} = \frac{21}{24}$, $\frac{2}{3} = \frac{2 \times 8}{3 \times 8} = \frac{16}{24}$

Since , the descending order of the numerators is 21 , 20 , 16 and 14

So , $\frac{21}{24} > \frac{20}{24} > \frac{16}{24} > \frac{14}{24}$

Then , the descending order of the fractions is $\frac{7}{8}$, $\frac{5}{6}$, $\frac{2}{3}$ and $\frac{7}{12}$




- **Compare using (<) or (>) :**

  [a] $\frac{2}{3}$ ☐ $\frac{5}{9}$ **[b]** $\frac{2}{4}$ ☐ $\frac{5}{6}$

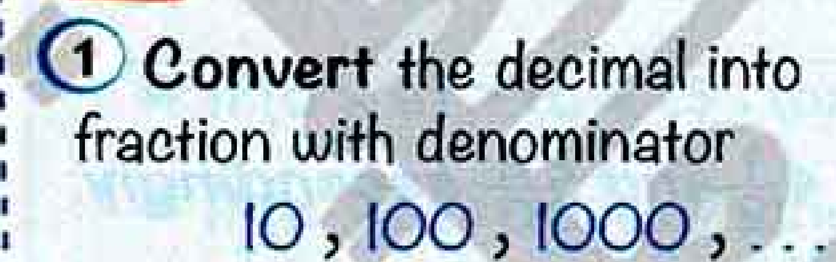
- **Arrange the following in an ascending order :**

$$\frac{2}{3} , \frac{3}{4} , \frac{5}{6} \text{ and } \frac{1}{2}$$



Fourth Comparing fractions and decimals

To compare a fraction and a decimal you can use one of the following two ways :



① **Convert** the decimal into fraction with denominator 10 , 100 , 1000 , . . .
, then **compare** between the two fractions as we have studied before.

② **Convert** the fraction into decimal using your calculator 
, then **compare** between the two decimals as we studied in the previous year.

Example 5

Compare using (>) or (<) :

[a] $3\frac{1}{4}$ ☐ 3.2   [b] $5\frac{7}{9}$ ☐ 5.7

Solution

[a] Since , $3.2 = 3\frac{2}{10} = 3\frac{2 \div 2}{10 \div 2} = 3\frac{1}{5}$

i.e. we want to compare between $3\frac{1}{4}$ and $3\frac{1}{5}$

Since , $\frac{1}{4} > \frac{1}{5}$ (because : 4 < 5)

Then , $3\frac{1}{4} > 3\frac{1}{5}$ *i.e.* $3\frac{1}{4} > 3.2$

Another Solution

Since , $3\frac{1}{4} = 3.25$ (by calculator)

i.e. we want to compare 3.25 and 3.2

Since , 3.25 > 3.2   *i.e.* $3\frac{1}{4} > 3.2$

[b] Since , $5.7 = 5\frac{7}{10}$ and $\frac{7}{9} > \frac{7}{10}$ (because : 9 < 10)

Then , $5\frac{7}{9} > 5\frac{7}{10}$ *i.e.* $5\frac{7}{9} > 5.7$



Another Solution

Since , $\frac{7}{9} \simeq 0.8$ (by calculator and approximating)

i.e. $5\frac{7}{9} \simeq 5.8$, then $5.8 > 5.7$

i.e. $5\frac{7}{9} > 5.7$

Example 6

Arrange the numbers : 6 , 4.2 , 2.3 , $5\frac{1}{4}$, $4\frac{1}{2}$ and $5\frac{2}{3}$ ascendingly.

Solution

1. The smallest number is 2.3 and the greatest number is 6
2. 4.2 and $4\frac{1}{2}$ are smaller than $5\frac{1}{4}$ and $5\frac{2}{3}$
3. Compare 4.2 and $4\frac{1}{2}$:

   Since , $4\frac{1}{2} = 4.5$ and $4.2 < 4.5$, then $4.2 < 4\frac{1}{2}$
4. Compare $5\frac{1}{4}$ and $5\frac{2}{3}$: $5\frac{1}{4} = 5\frac{1 \times 3}{4 \times 3} = 5\frac{3}{12}$ and $5\frac{2}{3} = 5\frac{2 \times 4}{3 \times 4} = 5\frac{8}{12}$

   Since , $5\frac{3}{12} < 5\frac{8}{12}$, then $5\frac{1}{4} < 5\frac{2}{3}$

   The order is : 2.3 , 4.2 , $4\frac{1}{2}$, $5\frac{1}{4}$, $5\frac{2}{3}$ and 6



- **Compare using (<) or (>) :**

[a] $2\frac{1}{2}$ ☐ 2.6 **[b]** $6\frac{2}{9}$ ☐ 6.2

Enrich your knowledge (Cross multiplication method)



To compare $\frac{a}{b}$ and $\frac{c}{d}$, you can do as follows :

Find the products d × a and b × c , then :

- If (d × a) < (b × c) , then $\frac{a}{b} < \frac{c}{d}$
- If (d × a) > (b × c) , then $\frac{a}{b} > \frac{c}{d}$
- If (d × a) = (b × c) , then $\frac{a}{b} = \frac{c}{d}$

Example 7

Compare using (>) , (<) or (=) :

[a] $\frac{3}{4}$ ☐ $\frac{5}{6}$ [b] $2\frac{4}{7}$ ☐ $\frac{5}{2}$ [c] $1\frac{1}{3}$ ☐ $1\frac{3}{9}$

Solution

[a] 18 20
$\frac{3}{4} \times \frac{5}{6}$

Since 18 < 20

So , $\frac{3}{4} < \frac{5}{6}$

[b] Since $2\frac{4}{7} = \frac{18}{7}$

36 35
$\frac{18}{7} \times \frac{5}{2}$

Since 36 > 35

So , $\frac{18}{7} > \frac{5}{2}$

So , $2\frac{4}{7} > \frac{5}{2}$

[c] Since $1\frac{1}{3} = \frac{4}{3}$, $1\frac{3}{9} = \frac{12}{9}$

36 36
$\frac{4}{3} \times \frac{12}{9}$

Since 36 = 36

So , $\frac{4}{3} = \frac{12}{9}$

So , $1\frac{1}{3} = 1\frac{3}{9}$

Exercise 2 — Comparing and ordering fractions

From the school book

1 Put the suitable relation (>) , (<) or (=) in the blanks :

a $\frac{1}{5}$ ☐ $\frac{4}{5}$
b $\frac{3}{4}$ ☐ $\frac{1}{4}$
c 📖 $\frac{7}{13}$ ☐ $\frac{5}{13}$
d $\frac{9}{10}$ ☐ $\frac{3}{10}$
e $\frac{5}{9}$ ☐ $\frac{4}{9}$
f $\frac{3}{4}$ ☐ $\frac{3}{5}$
g $\frac{1}{7}$ ☐ $\frac{1}{3}$
h $\frac{2}{8}$ ☐ $\frac{2}{4}$
i 📖 $\frac{8}{25}$ ☐ $\frac{8}{13}$
j $2\frac{7}{9}$ ☐ $2\frac{5}{9}$
k $2\frac{1}{8}$ ☐ $\frac{17}{8}$
l $3\frac{2}{5}$ ☐ $\frac{7}{5}$

2 Arrange each of the following in a descending order :

a $\frac{2}{11}$, $\frac{7}{11}$, $\frac{4}{11}$, $\frac{10}{11}$
b 📖 $\frac{13}{7}$, $\frac{5}{7}$, $\frac{9}{7}$, $\frac{4}{7}$, $\frac{11}{7}$
c $\frac{5}{9}$, 1 , $\frac{2}{9}$, $\frac{7}{9}$
d $\frac{7}{13}$, $\frac{7}{5}$, $\frac{7}{9}$, $\frac{7}{4}$, $\frac{7}{11}$
e $\frac{2}{10}$, $\frac{9}{10}$, $\frac{14}{10}$, 0.5 , $\frac{7}{10}$
f $1\frac{1}{5}$, $1\frac{4}{5}$, $1\frac{2}{5}$, $1\frac{3}{5}$
g $\frac{12}{5}$, $\frac{12}{7}$, $\frac{12}{17}$, $\frac{12}{13}$, $\frac{12}{15}$
h $8\frac{1}{7}$, $8\frac{3}{7}$, 9 , $8\frac{4}{7}$

3 Find the possible values of x which satisfy the following relations, where x is a whole number :

a 📖 $\frac{4}{7} < \frac{x}{7} < \frac{8}{7}$
b $\frac{5}{6} > \frac{5}{x} > \frac{5}{9}$
c 📖 $\frac{5}{8} < \frac{5}{x} < 1$
d $1 > \frac{x}{5} > \frac{1}{5}$

4 📖 Find the values of a , b and c if :

a $\frac{2}{5} = \frac{a}{15}$
b $\frac{b}{8} = \frac{15}{24}$
c $\frac{2}{3} = \frac{16}{c}$

5 Compare the following fractions :

a 📖 $\frac{3}{4}$, $\frac{2}{5}$
b $\frac{5}{8}$, $\frac{2}{3}$
c 📖 $\frac{7}{9}$, $\frac{3}{4}$
d $\frac{5}{2}$, $\frac{3}{5}$
e 📖 $\frac{4}{5}$, $\frac{3}{7}$
f 📖 $\frac{7}{12}$, $\frac{4}{5}$



g $\frac{4}{12}$, $\frac{1}{2}$

h 1 , $\frac{3}{4}$

i $\frac{5}{3}$, 1

j $\frac{3}{4}$, $\frac{2}{8}$

k $\frac{5}{6}$, $\frac{7}{8}$

l $\frac{5}{6}$, $\frac{7}{12}$

m $2\frac{1}{4}$, $2\frac{1}{3}$

n $3\frac{3}{4}$, $3\frac{5}{7}$

o $4\frac{7}{12}$, $4\frac{2}{3}$

p $\frac{18}{6}$, 3

q $\frac{8}{5}$, $1\frac{1}{6}$

r $2\frac{3}{4}$, $\frac{5}{2}$

6 Complete using (>) , (<) or (=) :

a 0.7 ☐ $\frac{7}{3}$

b 2.7 ☐ $2\frac{7}{9}$

c 3.2 ☐ $3\frac{1}{2}$

d $4\frac{1}{3}$ ☐ 4.3

e 0.03 ☐ $\frac{3}{95}$

f 0.12 ☐ $\frac{6}{50}$

7 Put (✓) for the correct statement and (✗) for the incorrect one :

a 📖 4376 < 0.407 ( )

b 📖 50.61 > 0.501 ( )

c $\frac{9}{12} > \frac{3}{4}$ ( )

d $\frac{1}{16} > \frac{1}{15}$ ( )

e 📖 $\frac{7}{8} > 0.775$ ( )

f 📖 $3.5 > 3\frac{4}{9}$ ( )

g 📖 $\frac{1}{4} = 0.25$ ( )

h $\frac{1401}{4312} < \frac{15}{11}$ ( )

8 Choose the correct answer between brackets :

a $\frac{4}{5}$ .... $\frac{5}{8}$ (< or > or =)

b $\frac{5}{6}$ .... $\frac{4}{7}$ (< or > or =)

c $\frac{1234}{1432}$ .... $\frac{1567}{891}$ (< or > or =)

d $\frac{13}{187}$ .... $\frac{9}{9}$ (< or > or =)

e $\frac{6}{5}$ .... $\frac{103}{196}$ (< or > or =)

f $\frac{8}{9}$ > .... ($\frac{7}{8}$ or $\frac{9}{10}$ or $\frac{19}{20}$ or $\frac{14}{15}$)

g $\frac{9}{10}$ < .... ($\frac{14}{20}$ or $\frac{17}{20}$ or $\frac{15}{20}$ or $\frac{19}{20}$)

h The smallest fraction of the following is .... ($\frac{1}{3}$ or $\frac{5}{8}$ or $\frac{2}{9}$ or $\frac{2}{5}$)





9 Arrange the following ascendingly :

a $\frac{5}{6}$, $\frac{3}{4}$, $\frac{1}{2}$, $\frac{7}{8}$

b $\frac{11}{12}$, $\frac{5}{12}$, $\frac{2}{3}$, $\frac{3}{4}$, $\frac{5}{6}$

c $4\frac{2}{5}$, $5\frac{1}{4}$, $4\frac{5}{8}$, $4\frac{1}{2}$, $4\frac{3}{4}$

d $\frac{3}{2}$, $\frac{3}{5}$, $\frac{3}{8}$, $\frac{6}{8}$, $\frac{3}{7}$

10 Arrange each of the following in an ascending order :

a $\frac{1}{2}$, 0.8 , $\frac{1}{4}$, 0.3 , $\frac{2}{5}$

b $3\frac{1}{2}$, 5 , 3.2 , $4\frac{1}{3}$, $4\frac{2}{7}$

c $7\frac{1}{6}$, 5.3 , $7\frac{2}{11}$, $5\frac{4}{7}$, 6

d 8 , $11\frac{4}{5}$, $12\frac{3}{7}$, $\frac{61}{7}$, 12.4



Word Problems



11 One day , Ramy walked $1\frac{7}{8}$ kilometres and Hoda walked $1\frac{9}{16}$ kilometres. Which distance was greater ?

12 On three different days , Sameh swam $\frac{5}{16}$ kilometre , $\frac{7}{8}$ kilometre and $\frac{3}{4}$ kilometre. Arrange the distances in an ascending order.





Challenge

13 Write all the fractions greater than zero , which are less than 1 and whose denominator is 5

14 Write all the fractions between 1 and 2 , and whose denominator is 7

15 Write all the fractions greater than zero , which are less than $\frac{1}{3}$ and whose denominator is 11







Lesson 3: Multiplying decimals by 10 , 100 and 1000



Use the calculator to find :



① 25.836 × 10

258.36

We note that :

The decimal point moved **1** place to the right.

② 25.836 × 100

2583.6

We note that :

The decimal point moved **2** places the right.

③ 25.836 × 1000

25836

We note that :

The decimal point moved **3** places to the right.

Rules

- **To multiply by 10**, move the decimal point 1 place to the right.

  For Example: 2.5739 × 10 = 25.739

- **To multiply by 100**, move the decimal point 2 places to the right.

  For Example: 2.5739 × 100 = 257.39

- **To multiply by 1000**, move the decimal point 3 places to the right.

  For Example: 2.5739 × 1000 = 2573.9



Lesson 3

Notice

Sometimes , we must put one or more zeroes on the right at the other places.

For Example :

- 3.7 × 100 = 370
- 3.7 × 1000 = 3700

Example 1

Find the result of each of the following :

[a] 75.23 × 10 **[b]** 0.0823 × 10 **[c]** 0.983 × 100

[d] 0.524 × 1000 **[e]** 12.6577 × 1000 **[f]** 0.18 × 10000

Solution

Using the previous rule , we find that :

[a] 75.23 × 10 = 752.3

[b] 0.0823 × 10 = 0.823

[c] 0.983 × 100 = 98.3

[d] 0.524 × 1000 = 524

[e] 12.6577 × 1000 = 12657.7

[f] 0.18 × 10000 = 1800

Example 2

The length of a piece of cloth is 77.75 metres. Calculate how many metres in 100 pieces of cloth of the same length each.



Solution

The number of metres = 77.75 × 100
= 7775 metres.



Exercise 3

Multiplying decimals by 10 , 100 and 1000

From the school book

1 Complete the following tables :

a ×10

6.5	1.25	0.17	0.795	0.001	3.151
....	....	....	....	....	....

b ×100

7.4	0.75	3.765	0.0006	6.01	0.008
....	....	....	....	....	....

c ×1000

2.345	2.54	2.3	0.251	17.09	0.001
....	....	....	....	....	....

2 Complete :

a 0.643 × 100 = ...

b 📖 3.18 × 10 = ...

c 📖 3.2 × 10 = ...

d 12.65 × 10 = ...

e 📖 72.14 × 100 = ...

f 📖 9.7 × 100 = ...

g 0.045 × 100 = ...

h 📖 3.2172 × 1000 = ...

i 100 × 7.787 = ...

j 📖 0.341 × 1000 = ...

k 1000 × 6.7 = ...

l 24.61 × 1000 = ...

m 0.184 × 10000 = ...

n 📖 7.5621 × 10000 = ...

3 Choose the correct answer :

a 5.67 × 10 = ... (567 *or* 0.567 *or* 56.7 *or* 0.0567)

b 📖 98.7 × 100 = ... (987 *or* 9870 *or* 0.987 *or* 0.0987)

c 6.172 × 100 = ... (617.2 *or* 61.72 *or* 6172 *or* 0.06172)

d 📖 0.067 × 1000 = ... (6.7 *or* 67 *or* 0.067 *or* 670)



e 📖 $21.3 \times 10 =$ .... (2130 or 2.13 or 213 or 0.0213)

f $0.00008 \times 1000 =$ .... (0.8 or 0.08 or 8 or 80)

g $0.27 \times 100 =$ .... (2.7 or 270 or 0.027 or 27)

h $69.25 \times 10 \simeq$ .... (to the nearest unit) (7 or 69 or 692 or 693)

i $5.3553 \times 1000 \simeq$ .... (to the nearest whole number)
(535.6 or 535.5 or 5355 or 53.55)

j $6.235 \times 10 \simeq$ .... (to the nearest tenth)
(62.2 or 62.3 or 62.4 or 62.5)

4 Put (✓) for the correct statement and (×) for the incorrect one :

a $9.54 \times 10 = 95.4$ (   )

b $0.0768 \times 10 = 0.768$ (   )

c $0.27 \times 10 = 27$ (   )

d $0.314 \times 100 = 31.4$ (   )

e $0.396 \times 1000 = 39.6$ (   )

f $0.0555 \times 100 = 55.5$ (   )

g $0.421 \times 1000 = 42.1$ (   )

h $0.54 \times 10000 = 540$ (   )

i $0.00006 \times 100 = 0.006$ (   )

j $0.001 \times 1000 = 1$ (   )

5 Put the suitable relation "< or > or =" :

a 📖 4.72×10 ☐ 0.472×100

b 📖 72.15×10 ☐ 0.07215×1000

c 2.4×10 ☐ 0.24×100

d 6.08×1000 ☐ 60.8×10

e 📖 3.251×100 ☐ 325.1×100

f 9.15×100 ☐ 91.5×100

g 0.723×1000 ☐ 0.0723×100

h 1.25×100 ☐ 0.0125×10

6 Complete :

a 25.69 × .... = 256.9

b 4.321 × .... = 4321

c .... × 0.254 = 2.54

d 7.5 × .... = 750

e 2.63 × .... = 2630

f 0.6201 × .... = 620.1

g 55.423 × .... = 5542.3

h 0.021 × .... = 21

i .... × 10 = 29.4

j .... × 100 = 25.5

7 Complete :

a 87.02 km. = ... m.

b 3.2 ton = ... kg.

c 2.05 m. = ... cm.

d L.E. 6.5 = P.T. ....

e 24.5 m. = ... cm.

f 2.589 m. = ... cm.

g 📖 3.002 kg. = ... gm.

h 📖 L.E. 728.9 = P.T. ....

i 📖 37.3 dm. = ... cm.

j 0.03 m^2 = ... dm^2

k 5.07 dm^2 = ... cm^2

l 5.7 L = ... mL

m 📖 8.657 m. ≃ .... cm. (to the nearest cm.)

n 7.5345 m. ≃ .... dm. (to the nearest dm.)

8 Complete :

a 📖 (72.12 + 2.7) × 10 = ...

b 📖 (8.35 – 2.14) × 100 = ...

c (72.5 – 63.721) × 1000 = ...

d 📖 (2.35 × 10) – 11.1 = ...

e (5.26 × 100) + 14.5 = ...

f (346.721 × 100) – (3.137 × 100) = ...





Lesson 3



Word Problems



9 Mona saves L.E. 7.75 from her pocket money in a month.

Calculate how much money she saves in 100 months.

10 If the length of a rectangle is 15.75 cm. and its width is 10 cm.

Find its area to the nearest cm^2

15.75 cm.

10 cm.

Challenge

11 Complete :

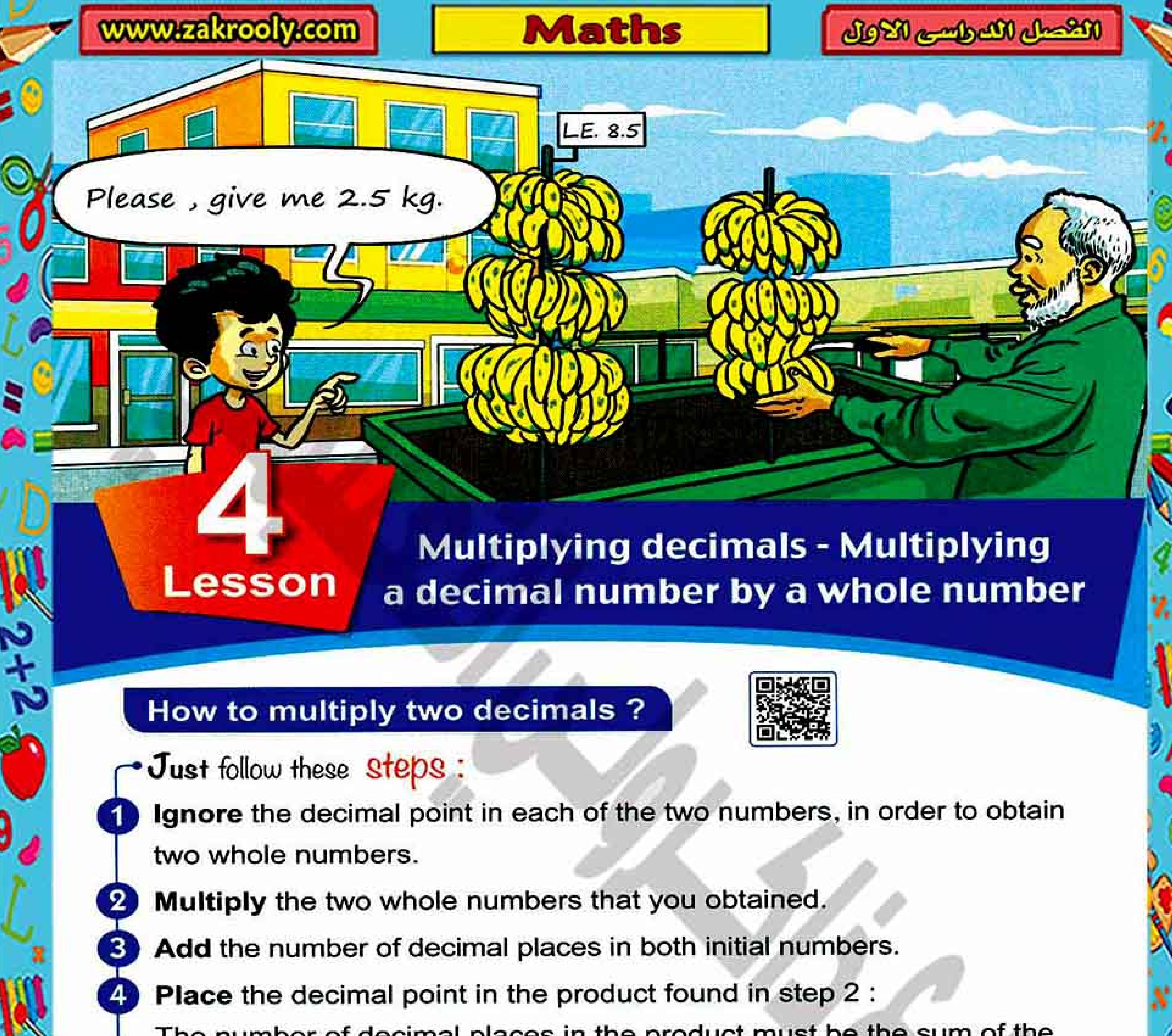
a 552.255 = ... × 10 = ... × 100 = ... × 1000

b 0.3 × 20 = 0.3 × 10 × ....

= (0.3 × 10) × .... = ... × .... = ...







4 Lesson
Multiplying decimals - Multiplying a decimal number by a whole number

How to multiply two decimals ?

Just follow these steps :

1. **Ignore** the decimal point in each of the two numbers, in order to obtain two whole numbers.
2. **Multiply** the two whole numbers that you obtained.
3. **Add** the number of decimal places in both initial numbers.
4. **Place** the decimal point in the product found in step 2 :
   The number of decimal places in the product must be the sum of the numbers of decimal places in both initial numbers.

For Example : To multiply : 2.45×0.7 , you can follow the following steps :

1. **Ignore** the decimal point to obtain two whole numbers 245 and 7
2. **Multiply** the two whole numbers :
   $245 \times 7 = 1715$
3. **Add** the numbers of decimal places in both initial numbers : $2 + 1 = 3$
4. **Place** the decimal point in the product : 1.715

	2.45	⇒ 2 decimal places
×	0.7	⇒ 1 decimal place
	1.715	⇒ 3 decimal places



Example (1)

Multiply :

[a] 0.46 × 0.9 [b] 219 × 4.8

Solution

We can multiply decimals directly as follows :

[a]

0.4 6	→ 2 decimal places
× 0.9	→ 1 decimal place
0.4 1 4	→ 3 decimal places

[b]

2 1 9	→ 0 decimal place
× 4.8	→ 1 decimal place
1 7 5 2	
+ 8 7 6	
1 0 5 1.2	→ 1 decimal place

Example (2)

Multiply : 0.02 × 0.4

Solution

0.0 2	→ 2 decimal places
× 0.4	→ 1 decimal place
0.0 0 8	→ 3 decimal places

Notice

We insert 2 zeroes to the left of 8 to make 3 decimal places.

Example (3)

Multiply :

[a] 725.6 × 0.1 [b] 539.42 × 0.01 [c] 2.431 × 0.001

Solution

[a] 725.6 × 0.1 = 72.56 (Note : 7256 × 1 = 7256)

725.6 → (1) decimal place; 0.1 → (1) decimal place; 72.56 → (2) decimal places

[b] 539.42 × 0.01 = 5.3942 (Note : 53942 × 1 = 53942)

539.42 → (2) decimal places; 0.01 → (2) decimal places; 5.3942 → (4) decimal places

[c] 2.431 × 0.001 = 0.002431 (Note : 2431 × 1 = 2431)

2.431 → (3) decimal places; 0.001 → (3) decimal places; 0.002431 → (6) decimal places



Remark

From the previous example, **we note that** :

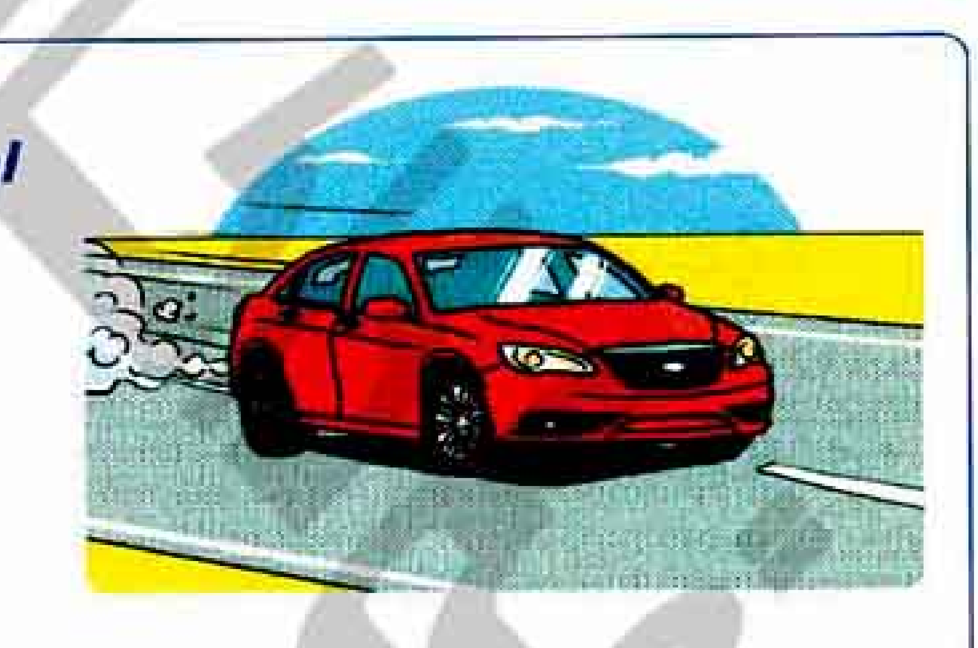
- To multiply by **0.1**, move the decimal point **1** place to the left.
- To multiply by **0.01**, move the decimal point **2** places to the left.
- To multiply by **0.001**, move the decimal point **3** places to the left.

So, we can find the product directly as follows :

- $31.523 \times 0.1 = 31.523$
- $173.02 \times 0.01 = 1.7302$
- $16.3 \times 0.001 = 0.0163$

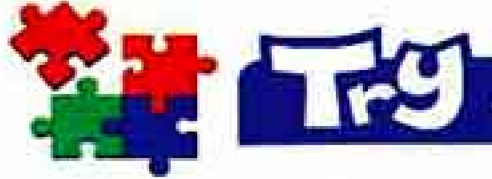
Example 4

A car covers equal distances in equal times. How many kilometres does it cover in $1\frac{1}{2}$ hours if its speed is 85.75 kilometres per hour ?



Solution

The number of kilometres = $85.75 \times 1\frac{1}{2} = 85.75 \times 1.5 = 128.625$



- **Find the product :**

  [a] 2.52×1.4 **[b]** 1.2×15 **[c]** 9.45×0.1







Estimation

Example 5

Estimate the following product , then compare your estimation to the actual product : 5.4 × 2.7

Solution

Estimation :

- 5.4 is estimated to 5
- 2.7 is estimated to 3

Then the estimation of the product is 5 × 3 = 15

Actual product :

$$\begin{array}{r} 5.4 \\ \times \quad 2.7 \\ \hline 378 \\ + \; 108 \\ \hline 14.58 \end{array}$$

It is clear that the estimation is acceptable.



Exercise 4

Multiplying decimals - Multiplying a decimal number by a whole number

From the school book

1 Place the decimal point in the product.
You may have to write zeroes in the product :

a 1.2 × 2.4 = 2 8 8	**b** 4.8 × 1.3 = 6 2 4	**c** 7.4 × 0.1 = 7 4
d 6.9 × 3 = 2 0 7	**e** 1.7 5 × 2.3 = 4 0 2 5	**f** 1 5.8 5 × 4.3 = 6 8 1 5 5
g 3.1 4 × 0.0 5 = 1 5 7 0	**h** 4.1 6 × 0.4 1 = 1 7 0 5 6	**i** 0.0 9 × 0.3 = 2 7
j 0.0 0 8 × 7 = 5 6	**k** 0.2 4 × 0.3 9 8 = 9 5 5 2	**l** 2 7.1 × 1 3.4 = 3 6 3 1 4

2 Find the product :

a 0.15 × 2 = ...	**b** 📖 0.819 × 8 = ...	**c** 1.374 × 6 = ...
d 📖 3.7 × 0.6 = ...	**e** 📖 2.03 × 0.07 = ...	**f** 9.4 × 6.8 = ...
g 98.21 × 0.11 = ...	**h** 📖 9.72 × 0.46 = ...	**i** 📖 6.461 × 28 = ...



j $0.09 \times 0.6 =$	**k** 📖 $0.67 \times 2.8 =$	**l** $37 \times 0.002 =$ ....
m $1.89 \times 5.8 =$	**n** $2.3 \times 0.004 =$	**o** $16.7 \times 12.3 =$ ....

3 Find the product of each of the following :

a $75 \times 0.1 =$ ....

b $342 \times 0.01 =$ ....

c $9246 \times 0.001 =$ ....

d $36.25 \times 0.1 =$ ....

e $36.25 \times 0.01 =$ ....

f $725.6 \times 0.001 =$ ....

g 📖 $2.37 \times 5 =$ ....

h 📖 $0.251 \times 9 =$ ....

i $0.6 \times 0.2 =$ ....

j $1.2 \times 0.4 =$ ....

k 📖 $7.2 \times 0.9 =$ ....

l $1.6 \times 0.04 =$ ....

m 📖 $0.12 \times 0.3 =$ ....

n 📖 $0.625 \times 0.7 =$ ....

o 📖 $1.2 \times 0.37 =$ ....

p $5.7 \times 0.18 =$ ....

q $6.8 \times 3.2 =$ ....

r 📖 $1.25 \times 0.24 =$ ....

4 Choose the correct answer :

a $2.3 \times 4 =$ .... (9.2 *or* 92 *or* 82 *or* 7.2)

b $0.2 \times 6.3 =$ .... (1.26 *or* 12.6 *or* 126 *or* 1.36)

c $0.56 \times 0.2 =$ .... (11.12 *or* 0.112 *or* 11.2 *or* 0.0112)

d $0.676 \times 0.1 =$ .... (67.6 *or* 0.0676 *or* 16.76 *or* 6706)

e $0.555 \times 0.3 =$ .... (0.1665 *or* 1.665 *or* 16.65 *or* 166.5)

f $3.4 \times 6.2 =$ .... (2.108 *or* 21.08 *or* 210.8 *or* 2108)

g $125 \times 0.8 =$ .... (100 *or* 1000 *or* 10 *or* 0.1)

h $8.43 \times 0.9 \simeq$ .... (to the nearest $\frac{1}{100}$)

(7.58 *or* 7.59 *or* 7.5 *or* 7.588)

i $1.775 \times 0.15 \simeq$ .... (to the nearest thousandth)

(0.267 *or* 0.266 *or* 0.265 *or* 0.27)

5 Compare the products of the following by putting "< , > or = " :

a 0.3×1.5 ☐ 3×0.5

b 7.5×0.02 ☐ 7.5×0.2

c 13.6×0.4 ☐ 0.136×0.4

d 📖 7.3×0.28 ☐ 0.73×2.8

e 📖 0.342×1.2 ☐ 3.42×0.12

f 📖 172×0.003 ☐ 0.172×0.3

g 📖 48.2×3.7 ☐ 4.82×37

h 📖 4.2×1.53 ☐ 4.2×15.3

i 📖 2.06×1.5 ☐ $2.06 \times 0.3 \times 0.5$

6 Find the result of each of the following :

a $(0.345 + 7.5) \times 4 =$ ....

b $5.6 \times (7 + 48) =$ ....

c $(26 - 13.01) \times 5 =$ ....

d $4.3 \times (13 + 22) =$ ....

e $(3.9 \times 12) + 6.2 =$ ....

f $(12.564 - 5.321) \times 0.001 =$ ....

g $4.82 \times (25 - 21.5) =$ ....

h 📖 $(2.15 \times 7) + (2.15 \times 3) =$ ....

i 📖 $(5.32 \times 0.15) + 0.146 =$ ....

j 📖 $(26.2 \times 4.7) - 3.14 =$ ....

7 📖 Estimate the products of the following operations, then compare your estimation to the actual product :

a 5.3×2.7

b 18.8×7.1

c 7.82×4.3





8 Find the product :

a 2.3 × 7.4 b 7.4 × 0.59

Use the resulted products to find the value of :

First : (2.3 × 7.4) × 0.59

Second : 2.3 × (7.4 × 5.9) , what do you observe ?

9 Calculate the perimeter of each of the following figures :

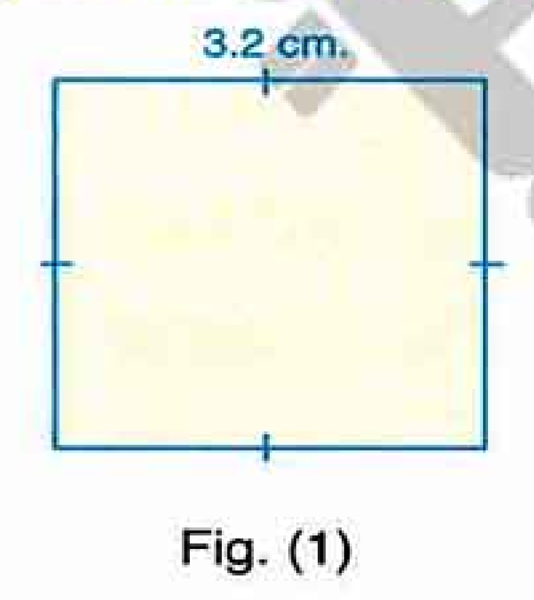


Fig. (1)

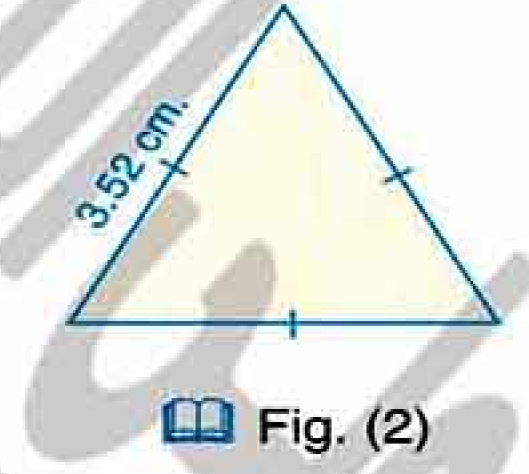


Fig. (2)

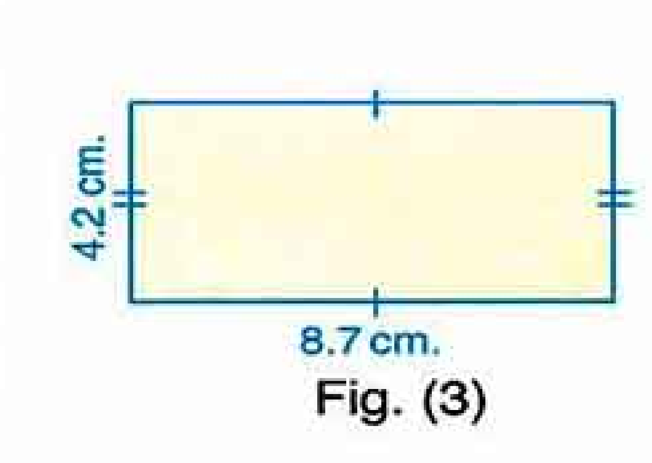


Fig. (3)

10 Calculate the area of a square of side length 2.4 cm. approximating it to the nearest tenth.

11 If the length of a rectangle is 2.65 cm. and its width is 1.5 cm. , calculate its area approximating it to the nearest hundredth.

Word Problems

12 Amgad goes to the supermarket for shopping. Calculate how much he will pay for the following bill :

The item	No. of items	Price of each one	Total
Glasses	6	L.E. 3.25	....
Dishes	12	L.E. 5.75	....
Butter packets	3	L.E. 0.75	....
Cans	2	L.E. 2.25	....
Total			....



13 Karim wants to buy 3 T-shirts that cost L.E. 45.75 each.
How much will they cost together ?



14 Noha bought 5 books for L.E. 15.5 each.
What is the price of these 5 books ?



15 The price of a bar of chocolate is L.E. 2.75 , what is the cost of 15 bars of the same kind ?

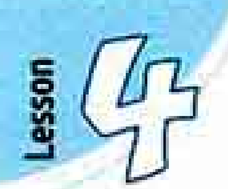


16 If the price of one metre of cloth is L.E. 6.45 , what is the cost of 2.4 metres of cloth ?



17 Abdo bought 5.25 kg. of oranges. If the price of each kilogram is L.E. 6.75 , calculate the price of what he bought to the nearest pound.





18 Ahmed bought 12 cans of juice.
The price of each can was L.E. 1.75
What is the total cost of the juice ?
How much would the seller pay back
to Ahmed if he paid to him L.E. 30 ?



19 Mariam went to the market. She bought
4.5 kilograms of fish each for L.E. 15 and
6 kilograms of apples each for L.E. 5.5
How much money did she pay ?



20 A car covers equal distances in equal
times. How many kilometres does it
cover in 2 hours and 15 minutes if its
speed is 73.25 kilometres per hour ?

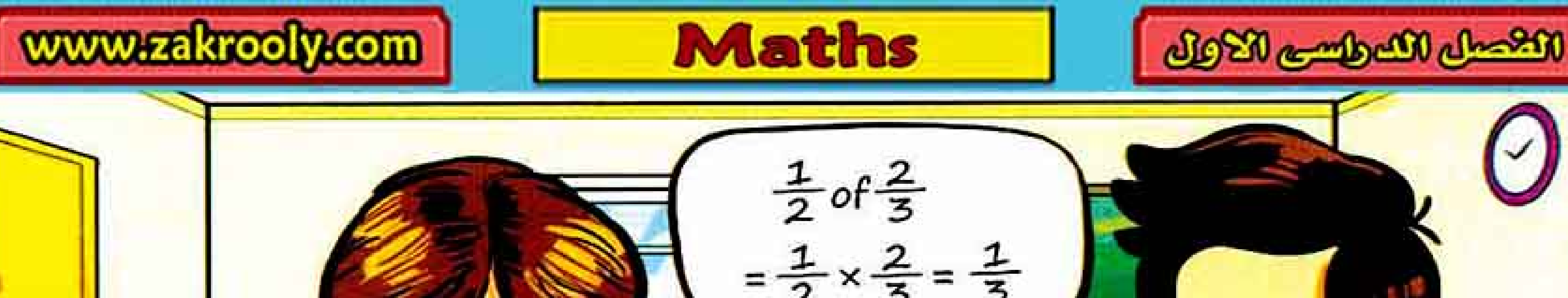


Challenge

21 **If 326 × 7 = 2282 and 37 × 52 = 1924 , then complete the following without multiplying :**

a 3.26 × 7 = ...
b 0.0326 × 7 = ...
c 32.6 × 7 = ...
d 3.7 × 52 = ...
e 0.37 × 52 = ...
f 0.326 × 7 = ...
g 0.0037 × 52 = ...
h 37 × 5.2 = ...
i 0.00326 × 7 = ...
j 3.26 × 17 = 3.26 × (7 + ...) = 3.26 × 7 + ... × ....
= ....







5 Lesson Multiplying fractions

First Multiplying two fractions



Rule

To multiply two fractions , do as follows :

1. Multiply the numerators of the two fractions to get the numerator of the product.
2. Multiply the denominators of the two fractions to get the denominator of the product.
3. Put the resulting fraction in its simplest form.

Example 1

Multiply each of the following fractions :

[a] $\frac{3}{4} \times \frac{5}{7}$ **[b]** $\frac{4}{9} \times \frac{2}{3}$

Solution

[a] Multiply the numerators → Multiply the denominators → $\frac{3}{4} \times \frac{5}{7} = \frac{3 \times 5}{4 \times 7} = \frac{15}{28}$ The simplest form

[b] $\frac{4}{9} \times \frac{2}{3} = \frac{4 \times 2}{9 \times 3} = \frac{8}{27}$





Lesson 5

Remark

If there is a common factor between the numerator of a fraction and the denominator of the second one , then divide each of them by this common factor.

Example 2



Multiply each of the following fractions :

[a] $\frac{7}{8} \times \frac{16}{21}$

[b] $\frac{3}{5} \times \frac{25}{36}$

Solution

[a] $\frac{7}{8} \times \frac{16}{21} = \frac{\cancel{7}^{1}}{{}_{1}\cancel{8}} \times \frac{\cancel{16}^{2}}{\cancel{21}_{3}} = \frac{1 \times 2}{1 \times 3} = \frac{2}{3}$

[b] $\frac{3}{5} \times \frac{25}{36} = \frac{\cancel{3}^{1}}{{}_{1}\cancel{5}} \times \frac{\cancel{25}^{5}}{\cancel{36}_{12}} = \frac{1 \times 5}{1 \times 12} = \frac{5}{12}$





- **Multiply :**

[a] $\frac{5}{6} \times \frac{2}{15}$

[b] $\frac{2}{3} \times \frac{3}{4}$





Second Multiplying a whole number by a fraction

Rule

To multiply a whole number by a fraction , do as follows :

1. Change the whole number to a fraction by placing it over a denominator of 1
2. Multiply the numerators.
3. Multiply the denominators.

Example (3)

Multiply each of the following :

[a] $\frac{1}{8} \times 2$ [b] $12 \times \frac{3}{4}$ [c] $\frac{1}{25} \times 10$ [d] $\frac{5}{7} \times 4$

Solution

[a]

$$\frac{1}{8} \times 2 = \frac{1}{8} \times \frac{2}{1} = \frac{1}{\cancel{8}_4} \times \frac{\cancel{2}^1}{1} = \frac{1 \times 1}{4 \times 1} = \frac{1}{4}$$

Placing it over a denominator of 1 Simplify

Notice

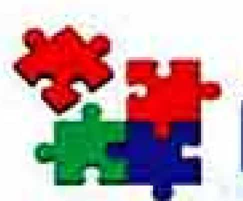
Placing a whole number over a denominator of 1 does not change the value of this number.

For Example : $2 = \frac{2}{1}$

[b] $12 \times \frac{3}{4} = \frac{\cancel{12}^3}{1} \times \frac{3}{\cancel{4}_1} = \frac{3 \times 3}{1 \times 1} = \frac{9}{1} = 9$

[c] $\frac{1}{25} \times 10 = \frac{1}{\cancel{25}_5} \times \frac{\cancel{10}^2}{1} = \frac{1 \times 2}{5 \times 1} = \frac{2}{5}$

[d] $\frac{5}{7} \times 4 = \frac{5}{7} \times \frac{4}{1} = \frac{5 \times 4}{7 \times 1} = \frac{20}{7} = 2\frac{6}{7}$




- **Multiply :**

[a] $\frac{2}{5} \times 15$ [b] $4 \times \frac{1}{8}$





Lesson 5

Third Multiplying a mixed number by a fraction or a mixed number

Rule

To multiply a mixed number by a fraction or a mixed number , do as follows :

1. Change the mixed number into an improper fraction.
2. Multiply the two fractions as shown in multiplying two fractions.

Example (4)

Multiply each of the following :

[a] $2\frac{2}{3} \times \frac{3}{4}$ [b] $\frac{5}{6} \times 7\frac{1}{2}$ [c] $1\frac{3}{4} \times 1\frac{2}{7}$

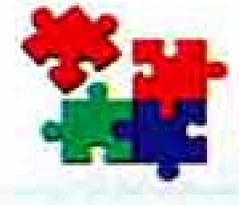
Solution

[a] $2\frac{2}{3} \times \frac{3}{4} = \frac{8}{3} \times \frac{3}{4} = \frac{2 \times 1}{1 \times 1} = \frac{2}{1} = 2$

Write the mixed number as a fraction : $2\frac{2}{3} = \frac{8}{3}$

[b] $\frac{5}{6} \times 7\frac{1}{2} = \frac{5}{6} \times \frac{15}{2} = \frac{5 \times 5}{2 \times 2} = \frac{25}{4} = 6\frac{1}{4}$ Write the result as a mixed number

[c] $1\frac{3}{4} \times 1\frac{2}{7} = \frac{7}{4} \times \frac{9}{7} = \frac{1 \times 9}{4 \times 1} = \frac{9}{4} = 2\frac{1}{4}$




Try by yourself

- **Multiply :**

[a] $1\frac{1}{5} \times \frac{2}{3}$ [b] $2\frac{1}{4} \times 18$






Example 5

Multiply the following using two different methods : $0.6 \times \frac{1}{2}$

Solution

1st method :

You can convert the decimal to a fraction :

$0.6 = \frac{\cancel{6}^{3}}{_{5}\cancel{10}} = \frac{3}{5}$ Then : $0.6 \times \frac{1}{2} = \frac{3}{5} \times \frac{1}{2} = \frac{3}{10}$

2nd method :

You can convert the fraction to a decimal :

$\frac{1}{2} = \frac{1 \times 5}{2 \times 5} = \frac{5}{10} = 0.5$ Then : $0.6 \times 0.5 = 0.3$

We have the same answer because $\frac{3}{10} = 0.3$





Exercise 5

Multiplying fractions

From the school book

1 Find the result of each of the following :

a $\frac{3}{4} \times \frac{5}{7}$
b $\frac{4}{5} \times \frac{6}{7}$
c $\frac{5}{6} \times \frac{5}{7}$
d $\frac{3}{5} \times \frac{3}{8}$
e $\frac{5}{9} \times \frac{2}{3}$
f $\frac{2}{9} \times \frac{5}{7}$
g $\frac{6}{11} \times \frac{4}{5}$
h $\frac{11}{12} \times \frac{5}{7}$

2 Multiply , then write the answer in its simplest form :

a $\frac{1}{8} \times \frac{2}{3}$
b $\frac{2}{9} \times \frac{3}{8}$
c $\frac{2}{9} \times \frac{3}{14}$
d $\frac{1}{2} \times \frac{4}{5}$
e $\frac{2}{5} \times \frac{1}{4}$
f $\frac{3}{4} \times \frac{8}{9}$
g $\frac{3}{4} \times \frac{20}{27}$
h $\frac{4}{9} \times \frac{3}{16}$

3 Multiply , then write the result in its simplest form (as a mixed number if it possible) :

a $\frac{3}{5} \times 15$
b $4 \times \frac{1}{4}$
c $\frac{2}{7} \times 21$
d $\frac{5}{6} \times 24$
e $9 \times \frac{5}{6}$
f $\frac{1}{3} \times 5$

4 Multiply , then write the result in its simplest form :

a $\frac{2}{5} \times 5\frac{1}{2}$
b $1\frac{2}{3} \times \frac{3}{10}$
c $7\frac{1}{2} \times \frac{2}{15}$
d $8\frac{3}{4} \times \frac{2}{7}$
e $\frac{4}{5} \times 12\frac{1}{2}$
f $\frac{3}{4} \times 8\frac{2}{3}$



g $2\frac{2}{3} \times 6$

h $4\frac{5}{6} \times 8$

i $3\frac{1}{2} \times 2\frac{2}{7}$

j $5\frac{1}{3} \times 3\frac{3}{8}$

k $2\frac{1}{2} \times 1\frac{1}{10}$

l $3\frac{1}{2} \times 1\frac{2}{6}$

m $5\frac{1}{2} \times 1\frac{4}{11}$

n $3\frac{2}{5} \times 4\frac{1}{2}$

5 Multiply , then write the result in its simplest form :

a $0.25 \times \frac{4}{5}$

b $\frac{4}{20} \times 0.8$

c $\frac{3}{5} \times 1.5$

d $0.6 \times 2\frac{1}{2}$

6 Multiply , then write the result in its simplest form :

a $\frac{3}{5} \times \frac{15}{16} \times \frac{8}{9}$

b $\frac{5}{6} \times \frac{2}{7} \times \frac{21}{35}$

c $\frac{1}{25} \times 50 \times 0.25$

d $0.6 \times 20 \times \frac{2}{5}$

7 Find the result of each of the following :

a $\frac{1}{3}$ of $\frac{2}{3}$

b $\frac{2}{3}$ of $\frac{3}{5}$

c $\frac{4}{5}$ of 25

8 Choose the correct answer between brackets :

a $7\frac{1}{2} \times \frac{1}{15} =$ .... (2 or $\frac{1}{2}$ or $\frac{16}{17}$ or $7\frac{1}{30}$)

b $4\frac{1}{2} \times 2\frac{2}{3} =$ .... (12 or $8\frac{1}{3}$ or $5\frac{2}{5}$ or $\frac{17}{6}$)

c $4\frac{1}{2} \times \frac{8}{27} =$ .... ($\frac{17}{29}$ or $4\frac{80}{54}$ or $1\frac{1}{3}$ or $4\frac{4}{27}$)

d $3\frac{1}{2} \times 2\frac{1}{2} =$ .... ($6\frac{1}{4}$ or $8\frac{3}{4}$ or $6\frac{3}{4}$ or 3)

e $\frac{4}{5} \times \frac{5}{7} \times \frac{7}{8} =$ .... ($\frac{1}{2}$ or $\frac{5}{8}$ or $\frac{4}{7}$ or $\frac{16}{20}$)

f $\frac{1}{4} \times \frac{2}{3} \times \frac{2}{5} =$ .... ($\frac{1}{5}$ or $\frac{1}{10}$ or $\frac{1}{15}$ or $\frac{5}{15}$)

g $1\frac{1}{4} \times 1\frac{1}{5} \times 1\frac{1}{6} =$ .... ($1\frac{3}{4}$ or $1\frac{1}{120}$ or $1\frac{1}{15}$ or $1\frac{1}{5}$)



9 Complete each of the following :

a $\frac{3}{4}$ of an hour = ... minutes

b $\frac{3}{4}$ of a metre = ... cm.

c $\frac{4}{5}$ of a kg. = ... gm.

d $\frac{5}{6}$ of a month = ... days

e Two thirds of one hour = ... minutes

f Two fifths of one kilometre = ... metres

g $2\frac{3}{4}$ years = ... months

h $1\frac{1}{4}$ days = ... hours

i L.E. $3\frac{1}{4}$ = P.T. ....

j $1\frac{3}{5}$ years = ... days

10 Put the suitable relation (>) , (<) or (=) in the blanks :

a $\frac{8}{9} \times 9$ ☐ 8

b $\frac{1}{5} \times 15$ ☐ $\frac{1}{2} \times 8$

c $\frac{1}{4} \times \frac{4}{5}$ ☐ $\frac{1}{2} \times \frac{2}{5}$

d $\frac{3}{4} \times \frac{8}{9}$ ☐ $\frac{1}{2} \times \frac{4}{9}$

e $\frac{3}{8} \times \frac{8}{9}$ ☐ $\frac{3}{4} \times \frac{4}{5}$

f $\frac{3}{8} \times 1\frac{3}{5}$ ☐ $\frac{3}{50}$

g $5\frac{1}{2} \times \frac{4}{11}$ ☐ 1

h $\frac{1}{3} \times \frac{6}{7}$ ☐ $\frac{4}{7} - \frac{1}{7}$

i $2\frac{1}{5} \times 0.5$ ☐ $\frac{11}{10}$

j $\frac{1}{2}$ of L.E. 30 ☐ $\frac{1}{5}$ of L.E. 80

k $\frac{3}{5}$ of an hour ☐ 35 minutes

l $\frac{1}{5}$ of minute ☐ 10 seconds

m 10 halves ☐ 20 fifths

n 30 thirds ☐ 40 quarters

11 Find the missing numbers :

a $\frac{3}{\dots} \times \frac{4}{5} = \frac{12}{35}$

b $\frac{1}{4} \times \frac{\dots}{3} = \frac{7}{12}$

c $\frac{3}{5} \times$ .... $= \frac{6}{15}$

d $\frac{2}{7} \times$ .... $= \frac{10}{49}$

e .... $\times \frac{3}{8} = \frac{15}{24}$

f $1\frac{1}{5} \times$ .... $= 1$

g $3\frac{1}{2} \times$ .... $= 7$

h $10\frac{1}{4} \times$ .... $= 41$

12 The width of a rectangle is $\frac{2}{5}$ of its length , if the length of the rectangle is 20 cm. , find the width of the rectangle then find its area.







Word Problems

13 A man has 30 feddans of agricultural land.
He planted rice in $\frac{5}{6}$ of them.
How many feddans were planted rice ?



14 Faiza is making spaghetti sauce.
The recipe calls for $1\frac{3}{4}$ cups of water ,
she wants to make $4\frac{1}{2}$ times the recipe.
How much water should she use ?



15 In a class , there are 30 pupils , $\frac{2}{3}$ of
them are boys , and $\frac{1}{5}$ of the boys have
blue eyes.
How many boys don't have blue eyes ?





16 Nagwa bought $8\frac{3}{4}$ kg. of meat for
L.E. 60 for each kg. If she gave the
butcher L.E. 600
How much money was left with her ?



Challenge

17 The age of Sami is one third of the age of his father. The age of his brother
Farid is one quarter of the age of Sami. If their father is 48 years old.
What is the age of each of them ?

18 Find the missing number :

a $\frac{\cdots\cdots}{2} \times \frac{4}{5} = \frac{6}{5}$

b $\frac{\cdots\cdots}{3} \times \frac{9}{11} = 1\frac{4}{11}$





Test on the first part of unit one

Answer the following questions :

1 Choose the correct answer from the given ones :

1. $\frac{4}{7} \times \frac{3}{8} = ...$ ($\frac{12}{15}$ or $\frac{3}{15}$ or $\frac{3}{14}$ or $\frac{6}{14}$)
2. $3\frac{1}{8} \simeq ....$ (to the nearest hundredth) (3.1 or 3.12 or 3.13 or 3.125)
3. Which of the following fractions is greater than $\frac{1}{2}$? ($\frac{7}{15}$ or $\frac{3}{13}$ or $\frac{4}{5}$ or $\frac{9}{22}$)
4. $2.7 \times 3.5 \square 0.27 \times 35$ (> or = or <)
5. $46.532 \simeq 46.53$ (to the nearest ......) (ten or 0.1 or 0.01 or 0.001)
6. 10 halves $\square$ 20 fifths (> or = or <)
7. If $\frac{3}{7} = \frac{12}{x}$, then $x = ...$ (4 or 28 or 21 or 9)
8. The side length of a square is 3.49 cm. , then its perimeter = ... cm. (1396 or 139.6 or 13.96 or 1.396)
9. $4.5986 \simeq ....$ (to the nearest 3 decimal places) (4.599 or 4.598 or 4.699 or 4.6)
10. $\frac{4}{5} \times 1\frac{1}{4} = ...$ ($\frac{16}{25}$ or $\frac{1}{5}$ or 1 or $\frac{5}{16}$)
11. $\frac{2}{3} \square \frac{4}{7}$ (> or = or <)
12. 17.65 pounds = ... piastres (176.5 or 0.1765 or 1765 or 1.765)
13. If $\frac{2}{9} < \frac{x}{9} < \frac{4}{9}$, then $x = ...$ where x is a whole number. (5 or 6 or 3 or 8)
14. $8.12 \square 7 \simeq 8.125$ (to the nearest $\frac{1}{1000}$) (5 or 3 or 6 or 4)



2 Complete the following :

15 $26.274 + 23.28 =$ .... $\simeq$ .... (to the nearest $\frac{1}{100}$)

16 $(3.7 \times 0.4) + 2.4 =$ ....

17 $9.561 - 2.8834 =$ .... $\simeq$ .... (to the nearest thousandth)

18 If $\frac{x}{15} = 2\frac{1}{3}$, then $x =$ ....

19 $3\frac{1}{2} \times 1\frac{3}{5} =$ ....

20 .... $\times 100 = 397$

21 45.9 kg. = ... gm.

22 $5.87 \times 100 = 58.7 \times$ ....

3 Answer the following :

23 Write the smallest decimal fraction which consists of 3 , 1 , 7 and 4 , then approximate it to the nearest $\frac{1}{100}$ and $\frac{1}{1000}$

The decimal fraction is ....

.... $\simeq$ .... (to the nearest $\frac{1}{100}$)

.... $\simeq$ .... (to the nearest $\frac{1}{1000}$)

24 Arrange the following numbers in an ascending order :

$\frac{7}{8}$, $\frac{1}{4}$, 1 and $\frac{3}{5}$

The order is : .... , ... , ... and ....

25 Find the area of the rectangle whose length is 16.25 m. and its width is 10 m. to the nearest m^2.

The area = ... = ... $\simeq$ .... m^2.

26 The price of one metre of cloth is 16.55 pounds , find the cost of 2.7 metres of the cloth to the nearest pound.

The cost = ... = ... $\simeq$ .... pounds.





Lesson 6 Dividing fractions

How to divide a fraction by another fraction ?



First fraction: $\frac{1}{4}$ ÷ Second fraction: $\frac{2}{3}$

Leave — Exchange — Flip

To divide a fraction by another fraction :
Exchange the numerator and the denominator of the second fraction **(the divisor)**, then multiply it by the first fraction.

$$\frac{1}{4} \times \frac{3}{2} = \frac{1 \times 3}{4 \times 2} = \frac{3}{8}$$

Another Example :

$$\frac{5}{7} \div \frac{4}{5} = \frac{5}{7} \times \frac{5}{4} = \frac{5 \times 5}{7 \times 4} = \frac{25}{28}$$

Remark

$\frac{5}{4}$ is called **the reciprocal** of $\frac{4}{5}$





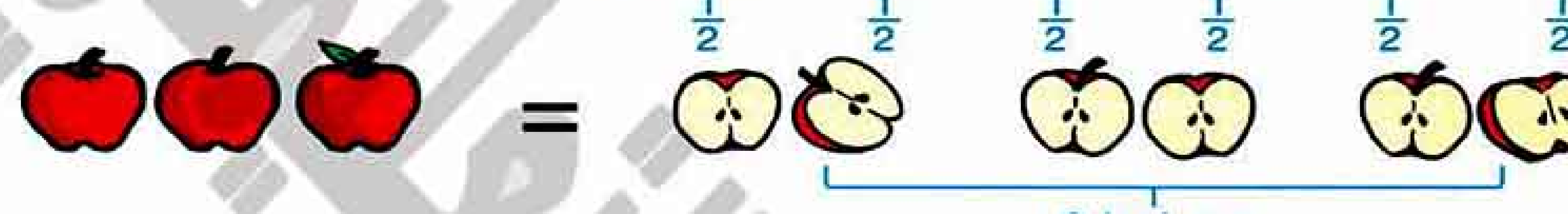
Example (1)

How many halves are there in 3 apples ?

Solution

To find the number of halves in 3 apples :

Divide each apple into 2 equal parts as in the following figure :



We can find the number of halves in 3 apples by dividing as follows :

$3 \div \frac{1}{2} = \frac{3}{1} \times \frac{2}{1} = \frac{3 \times 2}{1 \times 1} = 6$ halves

Example (2)

Find the result of each of the following :



[a] $15 \div \frac{3}{4}$

[b] $\frac{5}{7} \div \frac{5}{9}$

[c] $\frac{5}{9} \div 3$

[d] $1\frac{3}{5} \div 2\frac{1}{2}$

[e] $1\frac{4}{5} \div 5\frac{1}{4}$

[f] $2\frac{1}{4} \div 0.5$

Solution

[a] $15 \div \frac{3}{4} = \frac{15}{1} \times \frac{4}{3} = \frac{20}{1} = 20$

[b] $\frac{5}{7} \div \frac{5}{9} = \frac{5}{7} \times \frac{9}{5} = \frac{9}{7} = 1\frac{2}{7}$

[c] $\frac{5}{9} \div 3 = \frac{5}{9} \div \frac{3}{1} = \frac{5}{9} \times \frac{1}{3} = \frac{5}{27}$

[d] $1\frac{3}{5} \div 2\frac{1}{2} = \frac{8}{5} \div \frac{5}{2} = \frac{8}{5} \times \frac{2}{5} = \frac{16}{25}$

[e] $1\frac{4}{5} \div 5\frac{1}{4} = \frac{9}{5} \div \frac{21}{4} = \frac{9}{5} \times \frac{4}{21} = \frac{12}{35}$

[f] $2\frac{1}{4} \div 0.5 = \frac{9}{4} \div \frac{5}{10} = \frac{9}{4} \times \frac{10}{5} = \frac{9}{4} \times 2 = \frac{9}{2} = 4\frac{1}{2}$





- **Divide :**

[a] $\frac{2}{5} \div \frac{7}{10}$

[b] $2 \div \frac{2}{3}$

[c] $2\frac{1}{4} \div 9$

[d] $3\frac{3}{4} \div 1\frac{1}{2}$

Example 3

Find the missing fraction in each of the following :

[a] $\frac{2}{3} \times$ .... $= \frac{4}{5}$

[b] .... $\times \frac{3}{7} = 1$

[c] $\frac{2}{5} \div$ .... $= \frac{2}{3}$

[d] .... $\div \frac{2}{7} = 3$

Solution

[a] $\frac{2}{3} \times$ .... $= \frac{4}{5}$ (÷, =) , then : $\frac{4}{5} \div \frac{2}{3} = \frac{\overset{2}{\cancel{4}}}{5} \times \frac{3}{\underset{1}{\cancel{2}}} = \boxed{\frac{6}{5}}$

[b] .... $\times \frac{3}{7} = 1$ (=, ÷) , then : $1 \div \frac{3}{7} = 1 \times \frac{7}{3} = \boxed{\frac{7}{3}}$

[c] $\frac{2}{5} \div$ .... $= \frac{2}{3}$ (÷, =) , then : $\frac{2}{5} \div \frac{2}{3} = \frac{\overset{1}{\cancel{2}}}{5} \times \frac{3}{\underset{1}{\cancel{2}}} = \boxed{\frac{3}{5}}$

[d] .... $\div \frac{2}{7} = 3$ (=, ×) , then : $3 \times \frac{2}{7} = \boxed{\frac{6}{7}}$

Exercise 6

Dividing fractions

From the school book

1 Find the quotient of each of the following :

a $\frac{2}{5} \div \frac{3}{5}$
b $\frac{2}{3} \div \frac{1}{6}$
c $\frac{4}{5} \div \frac{1}{2}$
d $\frac{2}{3} \div \frac{3}{7}$
e $\frac{3}{8} \div \frac{3}{4}$
f $\frac{7}{9} \div \frac{7}{12}$
g $\frac{2}{7} \div \frac{5}{7}$
h $\frac{4}{10} \div \frac{6}{10}$
i $\frac{6}{7} \div \frac{8}{21}$
j $\frac{1}{2} \div \frac{1}{12}$
k $\frac{5}{6} \div \frac{25}{36}$
l $\frac{9}{10} \div \frac{3}{10}$
m $\frac{4}{3} \div \frac{2}{9}$
n $\frac{1}{2} \div \frac{3}{10}$
o $\frac{3}{4} \div 0.25$

2 Find the result of each of the following :

a $6 \div \frac{1}{3}$
b $12 \div \frac{3}{4}$
c $10 \div \frac{5}{7}$
d $45 \div \frac{9}{10}$
e $11 \div \frac{11}{7}$
f $63 \div \frac{7}{8}$
g $\frac{1}{4} \div 2$
h $\frac{3}{5} \div 6$
i $\frac{6}{7} \div 18$
j $\frac{7}{8} \div 21$
k $\frac{9}{10} \div 3$
l $5 \div \frac{10}{11}$

3 Find the quotient in each of the following :

a $6 \div 1\frac{1}{2}$
b $8 \div 1\frac{3}{5}$
c $10 \div 3\frac{1}{5}$
d $4\frac{2}{3} \div 7$
e $2\frac{2}{5} \div 24$
f $13\frac{1}{3} \div 8$
g $\frac{2}{3} \div 6\frac{2}{3}$
h $\frac{3}{4} \div 7\frac{1}{2}$
i $4\frac{1}{2} \div \frac{1}{2}$
j $6\frac{2}{3} \div \frac{5}{6}$
k $3\frac{3}{4} \div 7\frac{1}{2}$
l $1\frac{1}{2} \div 3\frac{3}{4}$
m $5\frac{1}{2} \div 3\frac{2}{3}$
n $4\frac{1}{6} \div 1\frac{2}{3}$
o $1\frac{2}{5} \div 5\frac{5}{7}$



Lesson 6

4 Find the result of each of the following :

a $\left(\frac{3}{7} \div \frac{6}{10}\right) \div \frac{4}{7}$

b $\left(3\frac{1}{2} \times 2\frac{1}{2}\right) \div \frac{35}{4}$

c $\left(\frac{5}{16} \div \frac{3}{8}\right) \times \frac{4}{5}$

d $\left(3 + \frac{9}{9}\right) \div 3\frac{1}{5}$

e $\left(\frac{3}{2} - \frac{1}{2}\right) \div \frac{5}{8}$

f $\left(1 \div \frac{1}{5}\right) - 2\frac{1}{2}$

5 Put the suitable sign (>) , (<) or (=) in the blanks :

a $3 \div \frac{1}{3}$ ☐ 8

b $\frac{3}{4} \div \frac{2}{3}$ ☐ $\frac{5}{7}$

c $\frac{1}{9} \times \frac{3}{8}$ ☐ $\frac{3}{4} \div 18$

d $\frac{7}{6} \div 1\frac{1}{6}$ ☐ 1

e $2\frac{1}{2} \div 1\frac{1}{4}$ ☐ 2

f $6\frac{1}{4} \div 1\frac{1}{4}$ ☐ 6

g $11\frac{1}{4}$ ☐ $9 \div \frac{4}{5}$

h $6 \div \frac{3}{4}$ ☐ $\frac{2}{3} \times 12$

i $1 - \frac{3}{7}$ ☐ $\frac{1}{2} \div \frac{7}{4}$

j $1\frac{2}{5} \div 2\frac{3}{5}$ ☐ $2\frac{3}{5} \div 1\frac{4}{5}$

k $1\frac{2}{9} \div 2\frac{3}{4}$ ☐ $2\frac{3}{5} \times 2\frac{4}{5}$

l $2\frac{1}{4} \div 3\frac{3}{8}$ ☐ $2\frac{2}{3} \div 2\frac{2}{3}$

6 Complete each of the following :

a $\frac{3}{5} \times$ .... $= 1$

b .... $\times \frac{7}{8} = 1$

c .... $\times 1\frac{1}{5} = 1$

d $5\frac{3}{4} \div$ .... $= 1$

e $3\frac{1}{2} \div$ .... $= \frac{5}{8}$

f .... $\div 1\frac{5}{7} = 5$

g $13\frac{1}{3} \div$ .... $= 8$

h $6\frac{1}{4} \div$ .... $= 2\frac{1}{2}$

i $\frac{1}{6} \div$ .... $= \frac{1}{4}$

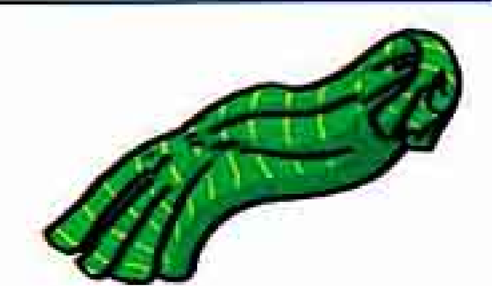
j $\frac{3}{\cdots\cdots} \div \frac{9}{14} = \frac{2}{3}$

Word Problems



7 If the price of 14 pens is L.E. $10\frac{1}{2}$

Find the price of each pen.



8 If the length of four pieces of cloth is $13\frac{1}{3}$ metres.

Find the length of each piece.







9 How many quarters of a pound are there in ten pounds and a half ?



10 How many $\frac{1}{6}$'s are there in $2\frac{1}{2}$ apples ?



11 How many $\frac{3}{4}$'s are there in $7\frac{1}{2}$ oranges ?



12 How many kg. of oranges can you buy for L.E. $31\frac{1}{2}$ if the price of each kg. is L.E. $4\frac{1}{2}$?



13 Mona bought a piece of cloth for L.E. 22 Find how many metres did Mona buy if the cost price of each metre was L.E. $2\frac{3}{4}$



14 A piece of land of area $92\frac{1}{2}$ feddans was divided equally among farmers. If each farmer took $4\frac{5}{8}$ feddans , then find the number of farmers.

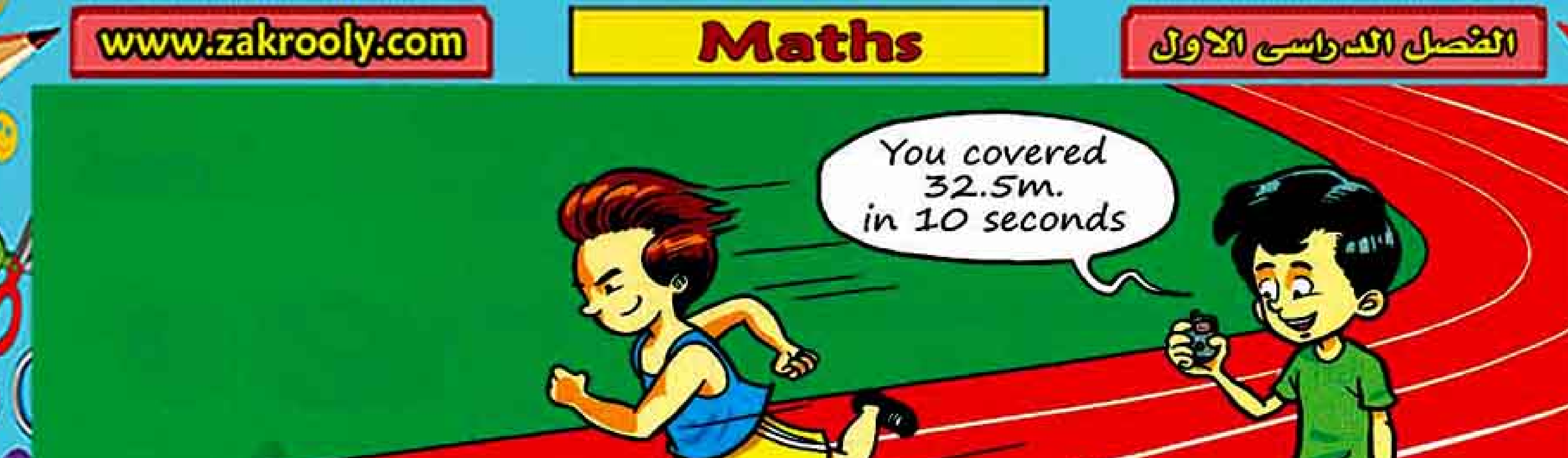


15 The perimeter of a piece of paper is shaped of square is $\frac{6}{11}$ m. Find the length of each side of the paper.



16 **Complete each of the following :**

a $\frac{6}{\dots\dots} \div \frac{2}{15} = 4\frac{1}{2}$ **b** $\frac{6}{7} \div \frac{\dots\dots}{28} = 1\frac{1}{2}$



7 Lesson Dividing decimals by 10 , 100 and 1000

 Use the calculator to find :

① 5461.8 ÷ 10

546.18

We note that :

The decimal point moved 1 place to the left.

② 5461.8 ÷ 100

54.618

We note that :

The decimal point moved 2 places to the left.

③ 5461.8 ÷ 1000

5.4618

We note that :

The decimal point moved 3 places to the left.

Rules

- **To divide by 10** , move the decimal point 1 place to the left.

  For Example : 2573.9 ÷ 10 = 257.39

- **To divide by 100** , move the decimal point 2 places to the left.

  For Example : 2573.9 ÷ 100 = 25.739

- **To divide by 1000** , move the decimal point 3 places to the left.

  For Example : 2573.9 ÷ 1000 = 2.5739



Notice

Sometimes , we must put one or more zeroes on the left , before the decimal point.

For Example :

- $3.7 \div 10 = 0.37$
- $3.7 \div 100 = 0.037$
- $3.7 \div 1000 = 0.0037$

Example 1

Find the result of each of the following :

[a] $21.43 \div 10$ | [b] $3456.7 \div 1000$ | [c] $37.53 \div 100$

[d] $12.35 \div 1000$ | [e] $0.27 \div 100$ | [f] $329 \div 1000$

Solution

[a] $21.43 \div 10 = 2.143$

[b] $3456.7 \div 1000 = 3.4567$

[c] $37.53 \div 100 = 0.3753$

[d] $12.35 \div 1000 = 0.01235$

[e] $0.27 \div 100 = 0.0027$

[f] $329 \div 1000 = 329.0 \div 1000 = 0.329$

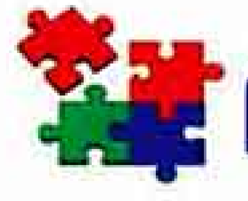
Example 2

An employee saved L.E. 3550.5 in 10 months. How much did he save in one month ?



Solution

What he saved in one month = $3550.5 \div 10$
= L.E. 355.05




- **Complete :**

[a] $51.23 \div 10 =$ ....
[b] $3521.5 \div 100 =$ ....
[c] $61.25 \div 1000 =$ ....
[d] $10.75 \div 100 =$ ....

Exercise 7

Dividing decimals by 10 , 100 and 1000

From the school book

1 Complete each of the following :

- a 64.43 ÷ 10 = ...
- b 400.5 ÷ 100 = ...
- c 32.57 ÷ 100 = ...
- d 700.2 ÷ 10 = ...
- e 537.1 ÷ 10 = ...
- f 4567.8 ÷ 1000 = ...
- g 9.6 ÷ 10 = ...
- g 6.243 ÷ 100 = ...
- i 659.1 ÷ 1000 = ...
- j 68.3 ÷ 100 = ...
- k 0.44 ÷ 100 = ...
- l 0.2 ÷ 10 = ...
- m 387.25 ÷ 1000 = ...
- n 3.6 ÷ 1000 = ...
- o 49.21 ÷ 1000 = ...
- p 0.05 ÷ 100 = ...
- q 0.093 ÷ 1000 = ...
- r 48.2 ÷ 10 000 = ...

2 Choose the correct answer :

- a 3.75 ÷ 100 = ... (0.375 or 0.00375 or 37.5 or 0.0375)
- b 1.7 ÷ 10 = ... (17 or 0.17 or 1.7 or 0.017)
- c 0.0398 ÷ 100 = ... (0.00398 or 39.8 or 0.398 or 0.000398)
- d 5743.4 ÷ 1000 = ... (5.7434 or 574.34 or 57.434 or 0.57434)
- e 75.3 ÷ 100 = ... (753 or 7.53 or 7530 or 0.753)
- f 8.76 ÷ 1000 = ... (87.6 or 8.76 or 0.00876 or 8760)

3 Put (✓) for the correct statement and (×) for the incorrect one :

- a 0.5 ÷ 10 = 0.50 ( )
- b 31 ÷ 1000 = 0.031 ( )
- c 0.4375 ÷ 100 = 0.04375 ( )
- d 76.43 ÷ 1000 = 0.07643 ( )
- e 0.043 × 10 = 0.043 ÷ 10 ( )
- f 0.777 × 100 = 77.7 ÷ 10 ( )
- g 0.7615 × 100 = 7615 ÷ 100 ( )





4 Put the suitable relation (>) , (<) or (=) in the blanks :

a 136.76 ÷ 100 ☐ 1367.4 ÷ 1000

b 608.3 ÷ 100 ☐ 508.7 ÷ 10

c 34.69 ÷ 10 ☐ 346.9 ÷ 100

d 27.65 ÷ 10 ☐ 2.765 ÷ 10

e 📖 4.532 ÷ 10 ☐ 45.32 ÷ 100

f 📖 3721 ÷ 1000 ☐ 0.3721 × 100

g 88.8 ÷ 100 ☐ 8.88 ÷ 10

h 987.6 × 100 ☐ 98.76 ÷ 10

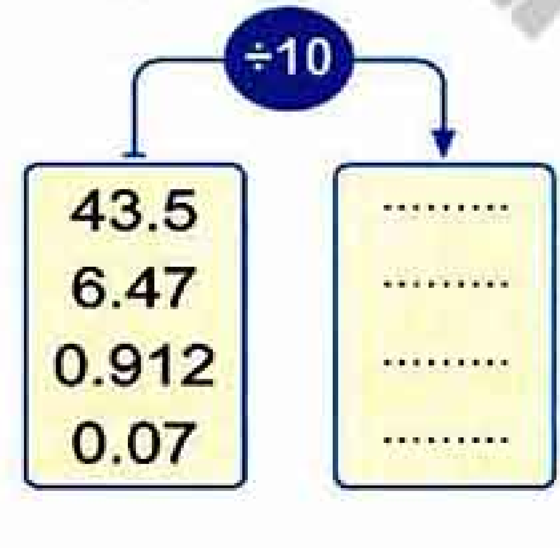
i 297.8 × 10 ☐ 29.78 ÷ 100

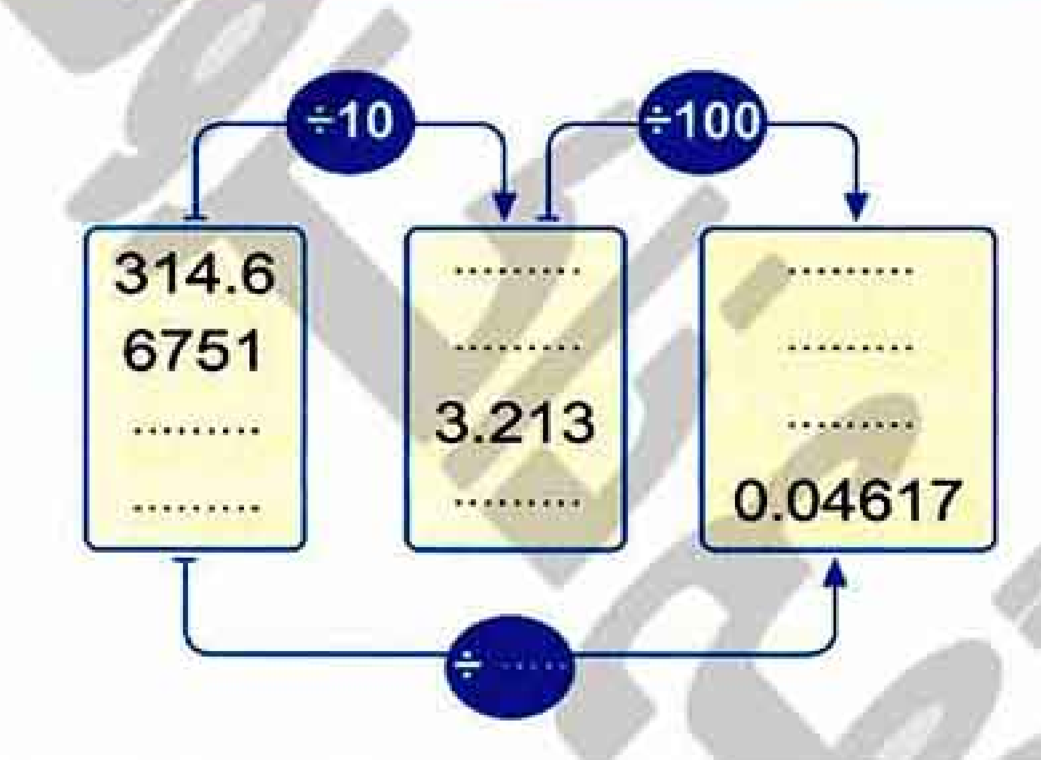
j 6429.7 ÷ 100 ☐ 7.766 × 10

5 Join the equal results :

a	5.0743 × 10	1	0.50743 × 10
b	507.43 × 10	2	0.50743 × 1000
c	50743 ÷ 100	3	50743 ÷ 10
d	50.743 ÷ 10	4	5074.3 ÷ 100

6 📖 Complete :





7 Complete :

a 37.9 ÷ .... = 3.79

b 17.55 ÷ .... = 0.1755

c 5879 ÷ .... = 58.79

d 9876.2 ÷ .... = 9.8762

e 21 ÷ .... = 0.021

f 0.1 ÷ .... = 0.001

g 72 ÷ .... = 0.0072

h .... ÷ 10 = 17.35

i .... ÷ 100 = 4.599

j .... ÷ 100 = 0.002

k .... ÷ 1000 = 5.59

l .... ÷ 1000 = 0.72

m .... ÷ 100 = 2.72 × 10

n .... ÷ 100 = 0.0002 × 100

8 Complete each of the following :

a 743 mm. = ... cm.

b 3237 gm. = ... kg.

c 0.7 gm. = ... kg.

d 80 cm. = ... m.

e 7.2 cm. = ... m.

f 158.7 cm. = ... m.

g 19.2 m. = ... km.

h 325 m. = ... km.

i P.T. 561.5 = L.E. ....

j 54 kg. = ... ton

k 419.5 kg. = ... ton

l 734 cm^3 = ... litre.

9 Complete each of the following :

a 26.4392 ÷ 10 = ... (to the nearest hundredth)

b 2.765 ÷ 10 = ... ≃ .... (to the nearest $\frac{1}{10}$)

c 6957.45 ÷ 100 = ... ≃ .... (to the nearest thousandth)

d (56.9 ÷ 10) + (0.095 × 100) = ... + ... = ...

e (9.292 × 10) – (8750 ÷ 1000) = ... – .... = ...

f (0.016 × 10) ÷ 100 = ... ≃ .... (to the nearest $\frac{1}{1000}$)

g (1.23 ÷ 100) + (86.1 ÷ 1000) = ... + ...

= .... ≃ .... (to the nearest $\frac{1}{100}$)

10 Complete in the same pattern :

a 2598.9 , 259.89 , 25.989 , ... , ... , ...

b 30 , 3 , 0.3 , ... , ... , ...

Word Problems



11 Soha bought 10 kg. of fruits for L.E. 47.5
Calculate the price of one kilogram.



12 A car consumes one litre of gasoline to travel 10 kilometres.
How many litres of gasoline does it need to travel a distance of 534.8 kilometres ?



13 A bicycle covered 45.8 m. in ten seconds.
How many metres did it cover in one second ?



14 A piece of cloth of length 345.6 metres is distributed among hundred poor men.
How many metres did each one take ?



15 The ministry of education bought 1000 computers for L.E. 2349650
Calculate the price of each computer.



16 A merchant bought 100 kg. of apple at a total price of L.E. 1495 and 1000 kg. of orange at a total price of L.E. 4750
What is the price of 1 kg. of orange and the price of 1 kg. of apple ?



17 Complete :

a $0.6 \div 20 = 0.6 \div$ .... $\div 10 =$ .... $\div 10 =$ ....

b $0.09 \div 30 = 0.09 \div$ .... $\div 10 =$ .... $\div 10 =$ ....

c $500.5 \div 500 = 500.5 \div$ .... $\div 100 =$ .... $\div 100 =$ ....

L.E. 7500
The monthly instalment = L.E. 625

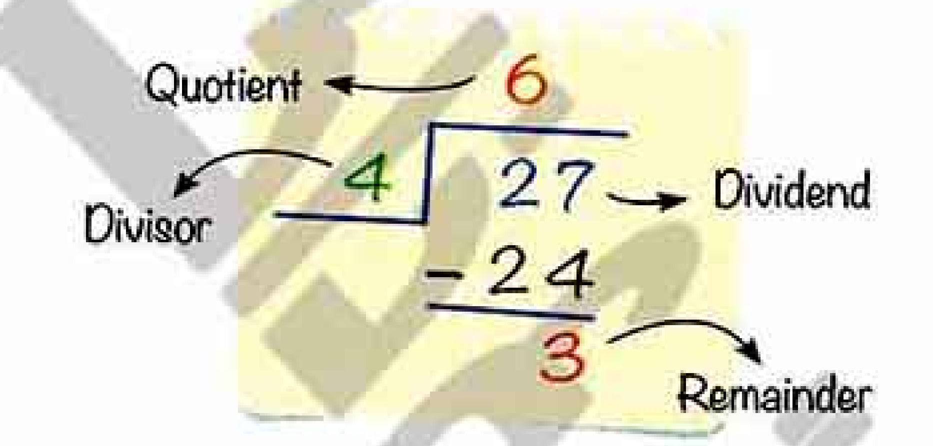
8 Lesson
Dividing a whole number by a 3-digit number without having a remainder



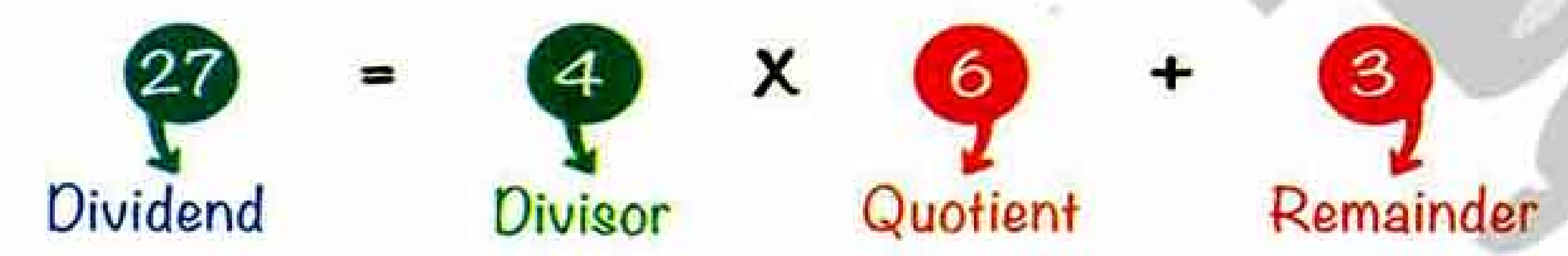
We know that :

27 ÷ 4 = 6 and the **remainder** is **3**

- 27 is called the dividend
- 4 is called the divisor
- 6 is called the quotient
- 3 is called the remainder



It is clear that :



i.e. **The dividened = (the divisor × the quotient) + the remainder**

Where the remainder is always less than the divisor

If the remainder is **0**, in this case, **the division is finite.**





Example 1

Divide : 19912 ÷ 152



Solution

When **dividing** by a **3-digit** number, **start** with the **first three digits to the left.**

1. Divide 199 by 152, the result is 1 and the remainder is 47 because :
   $1 \times 152 = 152$ & $199 - 152 = 47$

```
        1
152 | 19912
     -152
       47
```

2. Drop 1, then divide 471 by 152, the result is 3 and the remainder is 15 because :
   $3 \times 152 = 456$
   & $471 - 456 = 15$

```
        13
152 | 19912
     -152↓
       471
      -456
        15
```

3. Drop 2, then divide 152 by 152, the result is 1 and the remainder is 0

```
        131
152 | 19912
     -152
       471
      -456↓
        152
       -152
          0
```

Draft

You can use this draft to estimate the result of dividing by 152 :

$152 \times 0 = 0$
$152 \times 1 = 152$
$152 \times 2 = 304$ ← 199
$152 \times 3 = 456$
$152 \times 4 = 608$ ← 471

Note :
- 199 lies between 152 and 304
  So, we take 1 when dividing 199 by 152
- 471 lies between 456 and 608
  So, we take 3 when dividing 471 by 152

Then, $19912 \div 152 = 131$

You can check your answer by using the inverse operation "**multiplication**".

Check : $152 \times 131 = 19912$







Example 2

Divide : 12552 ÷ 523

Solution

1. Divide 125 by 523, the result is 0 and the remainder is 125

```
        0
523 | 12552
```

2. Divide 1255 by 523, the result is 2 and the remainder is 209

```
        02
523 | 12552
     -1046
       209
```

3. Drop 2 , then divide 2092 by 523, the result is 4 and the remainder is 0

```
        024
523 | 12552
     -1046↓
       2092
     - 2092
          0
```

Draft

523 × (0) = 0 ← 125
523 × 1 = 523
523 × (2) = 1046 ← 1255
523 × 3 = 1569
523 × (4) = 2092

Then, 12552 ÷ 523 = 24

Check : 523 × 24 = 12552







Example 3

Find the quotient of : 66744 ÷ 324

Solution

```
         206
324 | 66744
     - 648↓↓
        1944
      - 1944
           0
```

Note that :
Since 194 < 324, then we put 0 in the quotient and drop the next digit of the dividend which is 4, and go on.

Then, the quotient is 206

Draft
324 × 0 = 0 ← 194
324 × 1 = 324
324 × 2 = 648 ← 667
324 × 3 = 972
324 × 4 = 1296
324 × 5 = 1620
324 × 6 = 1944
324 × 7 = 2268

Check : 324 X 206 = 66744



- **Find the quotient of the following :**

[a] 3584 ÷ 112 [b] 16796 ÷ 323

Exercise 8

Dividing a whole number by a 3-digit number without having a remainder

📖 From the school book

1 Find the quotient of each of the following :

- **a** 5289 ÷ 123
- **b** 📖 6188 ÷ 221
- **c** 📖 3978 ÷ 234
- **d** 6266 ÷ 241
- **e** 8463 ÷ 217
- **f** 9262 ÷ 842
- **g** 25625 ÷ 125
- **h** 📖 62160 ÷ 296
- **i** 20449 ÷ 143
- **j** 📖 15345 ÷ 165
- **k** 📖 37961 ÷ 493
- **l** 📖 11183 ÷ 211
- **m** 128520 ÷ 357
- **n** 143639 ÷ 239

2 Choose the correct answer :

- **a** 4428 ÷ 123 = ... (36 *or* 35 *or* 34 *or* 32)
- **b** 15500 ÷ 125 = ... (1240 *or* 124 *or* 125 *or* 120)
- **c** 11664 ÷ 216 = ... (54 *or* 58 *or* 62 *or* 68)
- **d** 72795 ÷ 345 = ... (311 *or* 111 *or* 211 *or* 231)
- **e** 19708 ÷ 379 = ... (48 *or* 52 *or* 54 *or* 62)
- **f** 35624 ÷ 122 = ... (290 *or* 291 *or* 292 *or* 294)
- **g** 37440 ÷ 234 = ... (160 *or* 170 *or* 200 *or* 190)

3 Find the number which when multiplied by 117 , the result will be 2925

4 📖 The product of multiplying 2 numbers is 9088 If one of them is 284 Find the other number.

Word Problems

5 📖 A factory produces 235 pieces of cloth monthly. In how many months does it produce 26555 pieces of cloth ?







6 A shopkeeper saves L.E. 337 each month which he deposites in his bank account. After how many years he will save L.E. 16176 ?



7 An owner of a packing food factory wanted to pack 5904 kilograms of sugar equally in 492 packs. What is the weight of each pack ?



8 If the year is 365 days. How many years are there in 53655 days ?



9 A truck can carry 265 watermelons. Find the number of trips needed to transport 54060 watermelons.



10 A merchant paid L.E. 2975 to buy 119 boxes of mango. Find the price of each box and if each box contains 5 kg. of mango, so find the price of each kg.





11 **Knowing that (91512 ÷ 248 = 369), complete each of the following mentally :**

a 91512 ÷ .... = 248

b .... × 369 = 91512

c (91512 – 248) ÷ 248 = ...

d (91512 + 248) ÷ 248 = ...



How many bottles of milk can you get ?

7.5 litre

1.5 litre

9 Lesson Dividing by a decimal

In any division, if you multiply the dividend and the divisor by the same number ($\neq 0$) , the quotient doesn't change.

For Example : $8 \div 4 = 2$ and $8 \div 4 = \frac{8 \times 2}{4 \times 2} = \frac{16}{8} = 2$



Remark

To divide by a decimal, you can use the same way of dividing whole numbers, by writing the divisor as a whole number.

Do this by **multiplying the divisor and the dividend by 10, 100, 1000,** ... ect.

according to the number of places of the decimal part of the divisor.

For Example :

To **divide 32 by 0.4** , multiply the divisor by 10 (to change it into a whole number) , and then multiply also the dividend by 10

$0.4 \times 10 = 4$ and $32 \times 10 = 320$

So, $32 \div 0.4 = 320 \div 4 = 80$



Notice

You can move the decimal point in the dividend by the same number of places that you need to move the decimal point in the divisor to make the divisor a whole number.

For Example : $3.2 \div 0.4 = 32 \div 4 = 8$

More Examples :

- $0.42 \div 0.07 = \frac{0.42 \times 100}{0.07 \times 100} = \frac{42}{7} = 6$

  or $0.42 \div 0.07 = 42 \div 7 = 6$

- $2.72 \div 0.8 = \frac{2.72 \times 10}{0.8 \times 10} = \frac{27.2}{8} = 3.4$

  or $2.72 \div 0.8 = 27.2 \div 8 = 3.4$

Remark

You may need to **add a zero (or more) to the right** of the dividend so that you can move the decimal point.

For Example :

- $14.1 \div 1.41 = 14.10 \div 1.41 = 1410 \div 141 = 10$

Remark

To divide by a decimal, we can convert the decimals into fractions and divide fractions as we studied before.

For Example :

- $3.2 \div 0.4 = \frac{32}{10} \div \frac{4}{10} = \frac{32}{\cancel{10}_1} \times \frac{\cancel{10}^1}{4} = \frac{32}{4} = 8$



Example 1

Find the quotient of each of the following :

[a] 29.76 ÷ 6.4 **[b]** 0.1134 ÷ 0.18

Solution

a The quotient $= \frac{29.76 \times 10}{6.4 \times 10}$

$= \frac{297.6}{64}$ ← Divide

$= 4.65$

We must change the divisor to a whole number by multiplying the divisor and the dividend by 10

Draft

```
       4.65
64 ) 297.6
   - 256
      41.6
   -  38.4
       3.20
   -   3.20
       0.00
```

or directly :

The quotient = 29.76 ÷ 6.4

The divisor has one decimal place. So, the decimal point moves one place to the right in both , the divisor and the dividend.

= 297.6 ÷ 64 ← Divide

= 4.65

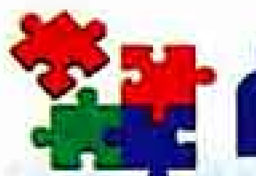
b The quotient = 0.1134 ÷ 0.18

= 11.34 ÷ 18

= 0.63

Draft

```
       0.63
18 ) 11.34
   - 10.8
      0.54
   -  0.54
      0.00
```





- **Find the quotient of the following :**

[a] 34.4 ÷ 0.4 **[b]** 3.175 ÷ 2.5



Example 2

Divide : $3\frac{1}{8} \div 0.125$

Solution

You can answer this question by using one of the following two methods :

• **1st method : convert the decimal into fraction :**

Since : $0.125 = \frac{125}{1000} = \frac{125 \div 125}{1000 \div 125} = \frac{1}{8}$

Then : $3\frac{1}{8} \div 0.125 = \frac{25}{8} \div \frac{1}{8} = \frac{25}{8} \times \frac{8}{1} = 25$

• **2nd method : convert the fraction into decimal :**

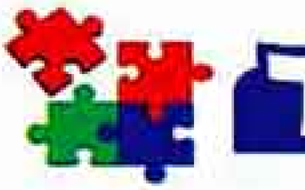
Since : $\frac{1}{8} = \frac{1 \times 125}{8 \times 125} = \frac{125}{1000} = 0.125$, then : $3\frac{1}{8} = 3.125$

Then : $3\frac{1}{8} \div 0.125 = 3.125 \div 0.125$

$= 3125 \div 125 = 25$

Draft

$$\begin{array}{r} 25 \\ 125 \,\overline{)\,3125} \\ -\ 250 \\ \hline 625 \\ -\ 625 \\ \hline 0 \end{array}$$




• **Divide :** $2\frac{3}{4} \div 0.25$

Example 3

Estimate the quotient of the following , then compare your estimation with the acutal quotient : $2.016 \div 0.84$

Solution

Since : $2.016 \simeq 2$ and $0.84 \simeq 1$

Then : the estimated quotient is : $2 \div 1 = 2$

So , $2.016 \div 0.84 = 201.6 \div 84$

$= 2.4$ The estimation is acceptable.

Draft

$$\begin{array}{r} 2.4 \\ 84 \,\overline{)\,201.6} \\ -168 \\ \hline 33.6 \\ -\ 33.6 \\ \hline 00.0 \end{array}$$



Exercise 9 Dividing by a decimal

From the school book

1 Complete each of the following as in the example :

Example

$3.5 \div 0.5 = 35 \div 5 = 7$

a $4.2 \div 0.7 =$ .... ÷ .... = ...

b $3.6 \div 0.4 =$ .... ÷ .... = ...

c $0.8 \div 0.2 =$ .... ÷ .... = ...

d $0.28 \div 0.04 =$ .... ÷ .... = ...

e $0.75 \div 0.25 =$ .... ÷ .... = ...

f $27.2 \div 0.8 =$ .... ÷ .... = ...

2 Complete each of the following as in the example :

Example

$$3.6 \div 0.45 = \frac{3.6 \times 100}{0.45 \times 100} = \frac{360}{45} = 8$$

a $72.36 \div 0.18 = \frac{72.36 \times \text{.........}}{0.18 \times \text{.........}} = \frac{\text{.........}}{\text{.........}} =$ ....

b $76.5 \div 7.65 = \frac{76.5 \times \text{.........}}{7.65 \times \text{.........}} = \frac{\text{.........}}{\text{.........}} =$ ....

c $55.33 \div 0.11 = \frac{55.33 \times \text{.........}}{0.11 \times \text{.........}} = \frac{\text{.........}}{\text{.........}} =$ ....

d $2.16 \div 7.2 = \frac{2.16 \times \text{.........}}{7.2 \times \text{.........}} = \frac{\text{.........}}{\text{.........}} =$ ....

e $94.5 \div 3.5 = \frac{94.5 \times \text{.........}}{3.5 \times \text{.........}} = \frac{\text{.........}}{\text{.........}} =$ ....

f $30.24 \div 3.6 = \frac{30.24 \times \text{.........}}{3.6 \times \text{.........}} = \frac{\text{.........}}{\text{.........}} =$ ....



3 Find the quotient of each of the following :

a 📖 0.8 ÷ 0.2
b 📖 36.18 ÷ 0.09
c 📖 0.75 ÷ 0.15
d 4.2 ÷ 0.06
e 📖 2.64 ÷ 0.2
f 📖 4.86 ÷ 0.9
g 9.2 ÷ 2.5
h 1.32 ÷ 1.1
i 9.6 ÷ 0.32
j 48.48 ÷ 4.8
k 📖 2.67 ÷ 1.2
l 📖 4.384 ÷ 0.32
m 📖 0.1932 ÷ 0.92
n 📖 1.155 ÷ 0.35
o 📖 357 ÷ 0.7
p 30.75 ÷ 4.1
q 📖 94.5 ÷ 3.5
r 114.45 ÷ 1.09
s 📖 3.375 ÷ 13.5
t 📖 77.728 ÷ 6.94
u 📖 21.528 ÷ 93.6
v 32.24 ÷ 12.4
w 16.112 ÷ 1.52
x 17.8932 ÷ 0.37

4 Put (✓) for the correct statement and (✗) for the incorrect one :

a 65.7 ÷ 6.57 = 100 ( )
b 152 ÷ 15.2 = 10 ( )
c 2.55 ÷ 1.7 = 1.5 ( )
d 33.66 ÷ 3.3 = 12 ( )
e 📖 3.6 × 1.3 = 1.3 × 3.6 ( )
f 📖 0.8 ÷ 0.04 = 0.04 ÷ 0.8 ( )

5 Put the suitable relation (>) , (<) or (=) in the blanks :

a 0.6 ÷ 0.125 ☐ 6 ÷ 0.125
b 55 ÷ 1.1 ☐ 55 ÷ 0.11
c 3838 ÷ 38.38 ☐ 38.38 ÷ 3838
d 462.3 ÷ 0.23 ☐ 4623 ÷ 2.3
e 1024 ÷ 64 ☐ 10.24 ÷ 0.64
f 882 ÷ 4.5 ☐ 88.2 ÷ 45
g 756 ÷ 5.4 ☐ 75.6 ÷ 0.054
h 📖 0.46 ÷ 4.6 ☐ 0.01

Lesson 9

6 Choose the correct answer :

a $48.24 \div 1.2 =$ .... (4.2 or 40.2 or 14.2 or 142)

b $87.5 \div 8.75 =$ .... (1 or 10 or 0.1 or 100)

c $4.8 \div 0.16 =$ .... (3 or 30 or 300 or 0.3)

d $728.14 \div 0.7 =$ .... (104.02 or 1040.2 or 10.402 or 10402)

e $54.45 \div 0.9 =$ .... (60.5 or 605 or 0.605 or 6.05)

f $87.29 \div 0.29 = 872.9 \div$ .... (2.9 or 29 or 290 or 0.29)

g $327 \div 24 = 3.27 \div$ .... (2.4 or 0.24 or 24 or 2004)

7 Find out each of the following operations :

a $62\frac{1}{2} \div 6\frac{1}{4}$

b $0.48 \div \frac{3}{5}$

c 📖 $\frac{17}{40} \div 0.85$

d $3\frac{1}{2} \div \frac{1}{2}$

e 📖 $2\frac{1}{8} \div 0.125$

f $8\frac{2}{5} \div 2\frac{1}{10}$

g $10\frac{3}{4} \div 1.25$

h $2\frac{3}{25} \div 0.016$

i 📖 $9.568 \div 9\frac{1}{5}$

8 Find the result of each of the following :

a 📖 $(92.36 - 63.25) \div 0.41$

b $(471.72 + 8.28) \div 1.5$

c 📖 $(19.645 - 4.73) \div 0.38$

d $(67.495 + 23.45) \div 0.05$

e $(6 \times 0.013) + (93 \div 0.02)$

f 📖 $(25.42 \div 3.1) + 1.8$

g $(0.23 \times 0.2) \div (58.13 - 58.03)$

h $5.78 + (228.92 \div 9.7)$

i $(50.84 \div 6.2) + 18.2$

j 📖 $3.62 - (55.25 \div 32.5)$

9 Fill in the blanks :

a $49.5 \div$ .... $= 100$

b $4.5 \div$ .... $= 9$

c 📖 $4.25 \div$ .... $= 8\frac{1}{2}$

d .... $\times 2.4 = 5.88$

10 📖 Find a number when multiplied by 0.64 , then the product is 75.52





11 Find out the divisor , if the dividend is 7.049 and the quotient is 0.07

12 Divide 375 by 0.5 , then add $5\frac{1}{4}$ to the quotient.

13 Without doing the division , estimate the quotient in each of the following :

a 8.018 ÷ 0.19 **b** 6.235 ÷ 0.58

c 0.1932 ÷ 0.92 **d** 77.428 ÷ 6.94

Check the reasonability of your estimation using your calculator.

14 Without doing the mathematical operations , estimate the result of each of the following :

a (5.3 × 11.2) ÷ 2.1 **b** (20.9 ÷ 7.1) × 5.2

Word Problems

15 The length of a roll of cloth is 53.55 metres. It was divided into equal parts where the length of each part is 3.15 metres. Find the number of these parts.



16 A train covered a distance of 221.65 km. in 2.75 hours. Calculate the distance it covers in one hour.



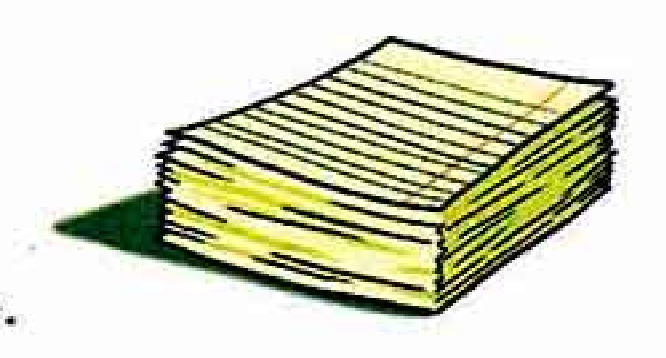
17 If L.E. 362.5 is distributed among the excellent pupils and each of them takes L.E. 14.5 Find the number of excellent pupils.



18 A building has the height of 42.75 metres. If the height of each floor is 2.85 metres , then find the number of floors.







19 A bundle of paper has a height of 4.5 cm.
If all its papers were of equal thickness where the thickness of each paper was 0.090 milimetres.
Find how many papers does the bundle include.



20 The area of a rectangle is 10.25 square metres , and its length is 4.1 metres. Find its width and perimeter.

21 If the sum of the prices of 12.75 kg. of cheese and 4.375 kg. of butter is L.E. 150.25 and the price of one kg. of butter is L.E. 10.3 , then find the price of one kg. of cheese.



22 Given that : 2752 ÷ 43 = 64 , then find mentally :

a 2752 ÷ 4.3
b 27.52 ÷ 4.3
c 275.2 ÷ 0.064
d 0.2752 ÷ 430

23 Given that : 46 × 57 = 2622 , then find mentally :

a 26.22 ÷ 0.57
b 26.22 ÷ 4.6
c 262.2 ÷ 5.7
d 262.2 ÷ 0.46
e 26.22 ÷ 0.057
f 2.622 ÷ 0.46

24 Complete :

a If 19.2 ÷ 0.2 = 96 , then 192 ÷ 0.2 = ...
b If 162.5 × 4.3 = 698.75 , then 69875 ÷ 162.5 = ...



Lesson 10 Infinite division

Converting fractions to decimals

Some fractions could be written as decimals to change one of these fractions to a decimal.

You can use one of the following two methods :

First method :

Make the denominator equal to 10 or 100 or 1000 or ··· by multiplying both of the numerator and the denominator by the same number.

For Example : $\frac{3}{4} = \frac{75}{100} = 0.75$ (×25 for numerator and denominator)

Second method :

Divide the numerator by the denominator , and put the decimal point in the correct place.

Notice

If we put zero to the right of a decimal, then its value does not change.

4.1 = 4.10

3 = 3.0



For Example :

To convert $\frac{3}{4}$ to a decimal fraction ,
divide 3 by 4 , **as the following :**

1. Since 3 < 4, write 0 and put the decimal point.

$$\begin{array}{r} 0. \\ 4\,\overline{)\,3.0} \end{array}$$

2. Divide 30 by 4, the result is 7 and the remainder is 2

$$\begin{array}{r} 0.7 \\ 4\,\overline{)\,3.0} \\ -\,2.8 \\ \hline 0.2 \end{array}$$

3. Since 2 < 4 , then put 0 to the right of 2 , then divide 20 by 4, the result is 5

$$\begin{array}{r} 0.75 \\ 4\,\overline{)\,3.0} \\ -\,2.8 \\ \hline 0.20 \\ -\,0.20 \\ \hline 0.00 \end{array}$$

Therefore , $\frac{3}{4} = 0.75$



Infinite division

Sometimes, when we divide the numerator of a fraction by the denominator, we never reach a final digit.

Example (1)

Convert $\frac{2}{3}$ to a decimal fraction approximating the result to the nearest hundredth.

Solution

- It is clear that we can't use the first method to solve this problem because there is no way to multiply by 3 to become 10 , 100 or 1000

So , we solve this problem by the second method.





- Notice that in this case, the operation of division is infinite, so we call it infinite division.

  We can go on the operation of division, but we need the result of division approximated to the nearest hundredth, so we only divide until we reach three decimal places, then we use the rules of approximation.

  Then, $\frac{2}{3} \simeq 0.67$ to the nearest hundredth.

```
        0.666
   3 | 2.0
      -1.8
       0.20
      -0.18
       0.020
      -0.018
       0.002
```

Example (2)

Divide 13 ÷ 123 approximating the quotient to two decimal places.

Solution

```
          0.105
   123 | 13.0
        -12.3
          0.700
        - 0.615
          0.085
```

Then, $13 \div 123 \simeq 0.11$ to the nearest hundredth.

Example (3)

Divide 1.21 ÷ 6 approximating the quotient to the nearest thousandth.

Solution

```
       0.2016
   6 | 1.21
      -1.2
       0.010
      -0.006
       0.0040
      -0.0036
       0.0004
```

Then, $1.21 \div 6 \simeq 0.202$

to the nearest thousandth.





Example (4)

Find the quotient of 12.584 ÷ 0.95 approximated to the nearest $\frac{1}{100}$

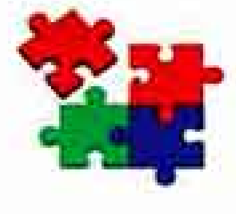
Solution

The quotient = 12.584 ÷ 0.95

= 1258.4 ÷ 95 ≃ 13.25

Draft

$$\begin{array}{r} 13.246 \\ 95 \overline{)1258.4} \\ -95 \\ \hline 308 \\ -285 \\ \hline 23.4 \\ -19.0 \\ \hline 4.40 \\ -3.80 \\ \hline 0.600 \\ -0.570 \\ \hline 0.030 \end{array}$$




- **Find the quotient of each of the following approximated to the nearest hundredth :**

[a] $\frac{3}{11}$ [b] 25.34 ÷ 0.6

Example (5)

How many weeks in 37 days ?

Solution

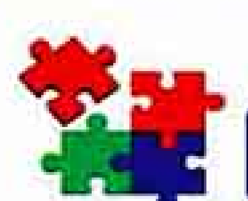
To find the number of weeks we divide 37 ÷ 7 approximated the result to nearest unit :

37 ÷ 7 ≃ 5

i.e. There exist approximately 5 weeks in 37 days.

Draft

$$\begin{array}{r} 5.2 \\ 7 \overline{)37} \\ -35 \\ \hline 2.0 \\ -1.4 \\ \hline 0.6 \end{array}$$




- **How many minutes in 275 hours ?**



Exercise 10

Infinite division

From the school book

1 Write each of the following fractions using a decimal point :

a $\frac{2}{5}$ | b $\frac{4}{25}$ | c $\frac{3}{8}$ | d $\frac{11}{125}$
e $\frac{7}{40}$ | f $\frac{97}{2}$ | g $\frac{125}{500}$ | h $\frac{100}{625}$

2 Write down each fraction in the decimal form approximated to the nearest hundredth :

a $\frac{1}{3}$ | b $\frac{1}{6}$ | c $\frac{2}{3}$
d $\frac{1}{12}$ | e $\frac{5}{11}$ | f $\frac{4}{7}$

3 Complete :

a $\frac{7}{3} \simeq$ .... (to the nearest $\frac{1}{10}$)

b $\frac{5}{9} \simeq$ .... (to the nearest $\frac{1}{100}$)

c $\frac{3}{11} \simeq$ .... (to the nearest $\frac{1}{100}$)

d $\frac{9}{7} \simeq$ .... (to the nearest $\frac{1}{10}$)

e $\frac{11}{13} \simeq$ .... (to the nearest $\frac{1}{1000}$)

f $\frac{17}{121} \simeq$ .... (to the nearest $\frac{1}{100}$)

4 Find the quotient of each of the following approximated to the nearest $\frac{1}{10}$:

a $9 \div 35$ | b $15 \div 112$ | c $8 \div 7$
d $13 \div 123$ | e $24 \div 108$ | f $12929 \div 517$
g $546.8 \div 53$ | h $53.27 \div 2.1$ | i $24.31 \div 0.97$
j $1.623 \div 0.152$ | k $12.46 \div 0.517$ | l $2\frac{3}{25} \div 0.012$









Lesson 10

5 Find to the nearest hundredth the quotient of each of the following :

a $46 \div 2.8$
b $7.4 \div 5.1$
c 📖 $7.034 \div 1.7$
d 📖 $458.62 \div 35.2$
e $224.8 \div 12.4$
f $365.13 \div 23.7$

6 Carry out each of the following :

a $8.5 \div 2.7$ (approximated to the nearest tenth)
b $1300.29 \div 52.8$ (approximated to the nearest $\frac{1}{100}$)
c $28.448 \div 1.2$ (approximated to the nearest tenth)
d $458.62 \div 35.2$ (approximated to the nearest $\frac{1}{1000}$)
e $251.76 \div 38\frac{1}{4}$ (approximated to the nearest $\frac{1}{1000}$)

7 📖 Find the results and approximate them to the nearest hundredth :

a $(3.425 + 1.07) \div 2.8$
b $7.52 \div (14.73 - 11.58)$

8 Complete the following :

a 📖 39 days ≃ .... weeks
b 254 hours ≃ .... days
c 📖 67 months ≃ .... years
d 365 seconds ≃ .... minutes

9 Choose the correct answer :

a 43 days ≃ .... weeks (to the nearest week) (4 or 5 or 6 or 7)
b 272 minutes ≃ .... hours (to the nearest hour) (4 or 5 or 6 or 7)
c 📖 $53.7 \div 3.5$ .... $5.37 \div 0.35$ (< or > or =)
d 📖 $845 \div 4.9$ .... $(84.5 \div 49) \times 0.1$ (< or > or =)

10 📖 The area of a rectangle is 9.43 cm^2, and its width is 2.45 cm.
Find its length and approximate it to the nearest hundredth of centimetre.







11 A rich man left a heritage of L.E. 1256987 for his 8 sons.
What is the share of each son ?
(give the answer approximated to the nearest L.E.)



12 Hany's father bought a flat for L.E. 125000
He paid L.E. 31250 in cash, and paid the rest in 144 equal instalments.
Find to the nearest L.E. the value of each instalment.





13 If 0.3333333 is written as $0.\dot{3}$, then find the quotient of each of the following and write it in the same form :

a $\frac{7}{9}$ **b** $\frac{2}{3}$



Test on the second part of unit one

Answer the following questions :

1 Choose the correct answer from the given ones :

1. $\frac{1}{2} \div \frac{1}{4} =$ .... ($\frac{1}{2}$ or 2 or 8 or $\frac{1}{8}$)
2. $7.86 \div 100 =$ .... (78.6 or 0.786 or 0.00786 or 0.0786)
3. 50 days ≃ .... weeks (to the nearest week) (4 or 5 or 6 or 7)
4. $22724 \div 247 =$ .... (91 or 92 or 82 or 81)
5. $3\frac{1}{2} \div \frac{7}{12} =$ .... (4 or $\frac{50}{12}$ or $\frac{3}{18}$ or 6)
6. $4.439 \div 1.93 =$ .... $\div 193$ (4 439 or 443.9 or 0.4439 or 44.39)
7. The reciprocal of $1\frac{3}{5}$ is .... ($\frac{8}{5}$ or $\frac{5}{3}$ or $\frac{5}{8}$ or $\frac{8}{3}$)
8. 4478 gm. = ... kg. (44.78 or 0.4478 or 4.478 or 447.8)
9. $\frac{4}{3} \times$ .... $= 1$ ($\frac{5}{4}$ or $\frac{1}{4}$ or 0.75 or 0.8)
10. $54.76 \div$ .... $= 5.476$ (10 or 100 or 1000 or 0.1)
11. $\frac{3}{11} \simeq$ .... (to the nearest tenth) (0.2 or 0.27 or 0.3 or 0.7)
12. $20976 \div$ .... $= 912$ (24 or 34 or 23 or 32)
13. $3.304 \div 1.4 =$ .... (23.6 or 2.36 or 236 or 0.236)
14. $5\frac{1}{3} \div 1\frac{1}{3} =$ .... (5 or 4 or 3 or 6)

2 Complete the following :

15. $\frac{8}{3} \simeq$ .... (to the nearest $\frac{1}{100}$)
16. $10535 \div 245 =$ ....
17. $\frac{8}{13} \times$ .... $= \frac{4}{9}$





18 $4\frac{1}{6} \div 5 =$ ....

19 $62.5 \div 0.25 =$ ....

20 $7 \div 3\frac{1}{2} =$ ....

21 572.3 cm. ≃ .... m. (to the nearest metre)

22 $256.1 \div 39 \simeq$ .... (to the nearest one decimal place)

3 Answer the following :

23 The result of multiplying two numbers is 17604 , if one of them is 326 Find the other number.

The other number = ... = ...

24 A train covered a distance of 1074.9 km. in 10 hours , calculate the distance it covers in one hour.

The distance = ... = ... km.

25 A barrel has 236.25 litres of oil , if we want to pack it in bottles where every bottle holds 0.75 litres. Find the number of bottles.

The number of bottles = ... = ... bottles.

26 How many thirds are there in 5 oranges ?

The number of thirds = ... = ... thirds.





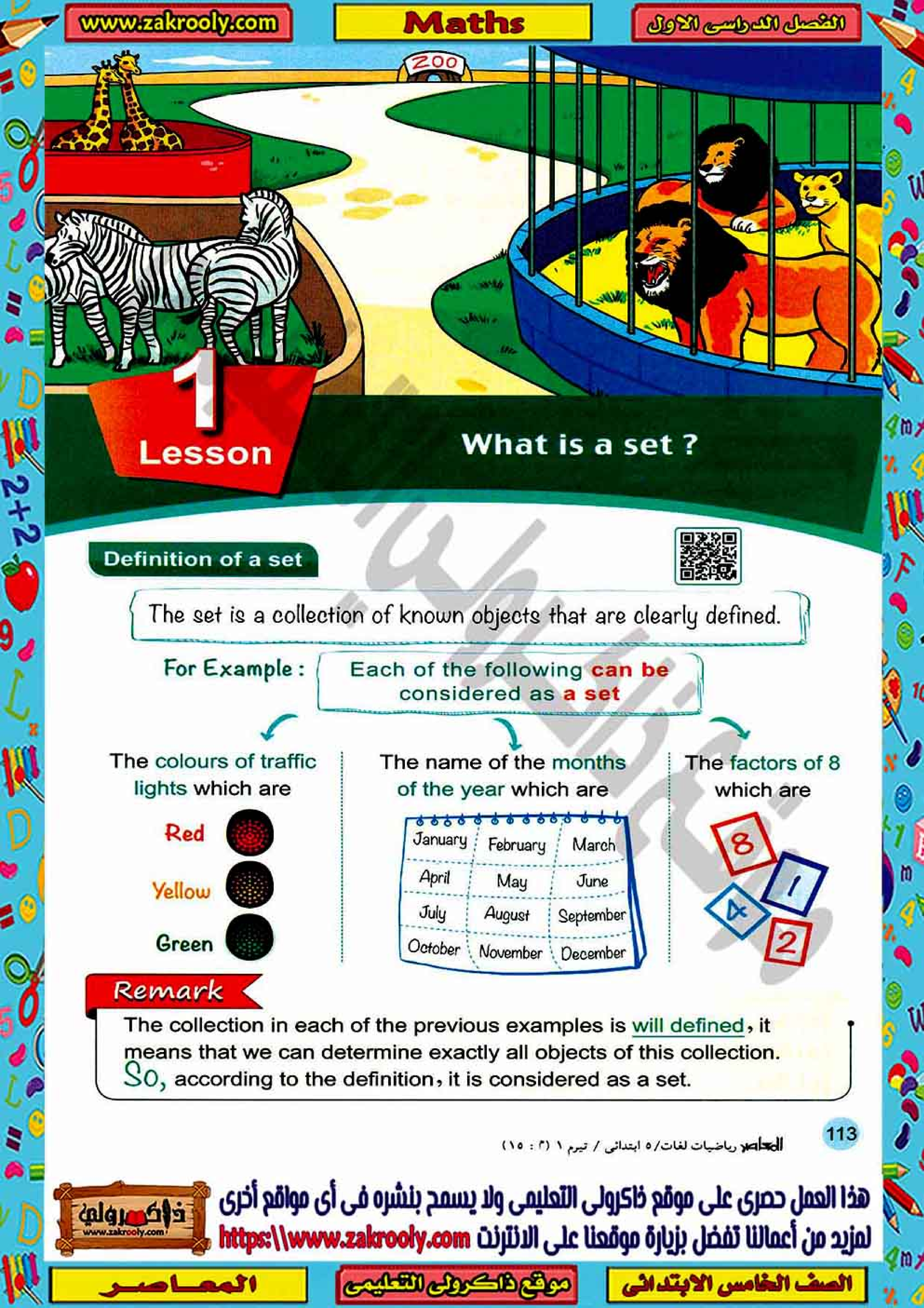
Unit Two

Sets

Unit Aims

By the end of this unit, student should be able to :

- recognize the set and its elements.
- express a set using the listing method and the description method.
- represent sets by Venn diagrams.
- recognize the relation of beloging of an element to a set and its symbol.
- recognize the types of sets.
- know the conditions of equality of two sets.
- recognize the relation of inclusion and subset and its symbol.
- recognize the relation of intersection of two sets and its symbol and its properties.
- recognize the relation of union of two sets and its symbol and its properties.
- recognize the universal set and its symbol.
- determine the complement of a set and its symbol.
- determine the difference between two sets.



1 Lesson What is a set ?

Definition of a set

The set is a collection of known objects that are clearly defined.

For Example : Each of the following **can be considered as a set**

The colours of traffic lights which are
- Red
- Yellow
- Green

The name of the months of the year which are

January	February	March
April	May	June
July	August	September
October	November	December

The factors of 8 which are
8, 1, 4, 2

Remark

The collection in each of the previous examples is will defined, it means that we can determine exactly all objects of this collection.
So, according to the definition, it is considered as a set.

For Example : Each of the following **can not be** considered as **a set**

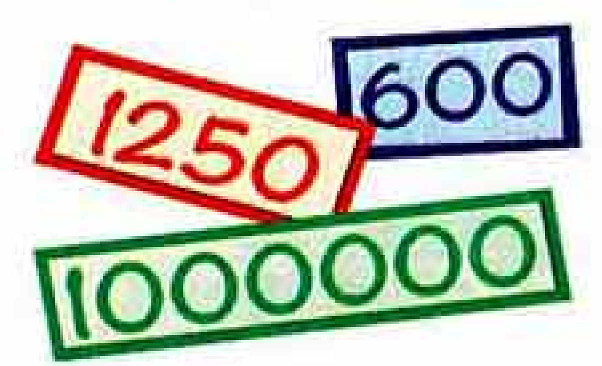
The beautiful flowers.



The small animals.



The big numbers.



Remark

The collection in each of the previous examples is not well defined, it means that we can not determine exactly the objects of this collection. So, according to the definition, it can not be considered as a set.

Example 1

Put "set" or "not set" in the blank :

[a] The digits of the number 2010 ....

[b] High buildings. ....

[c] Nice fruits. ....

[d] The Arabic alphabet. ....

[e] The letters in the name "Marwan". ....

[f] Beautiful songs. ....

[g] The prime numbers less than 15 ....

[h] The small trees in the street. ....

Solution

[a] Set.
[b] Not set.
[c] Not set.
[d] Set.
[e] Set.
[f] Not set.
[g] Set.
[h] Not set.






Example 2

State which of the following is a set and which is not a set and why ?

[a] The factors of the number 12

[b] The names of the seasons of the year.

[c] The tall pupils in your class.

Solution

[a] Set. [b] Set.

[c] Not a set because we cannot determine in an exact manner if the pupil is tall or short.

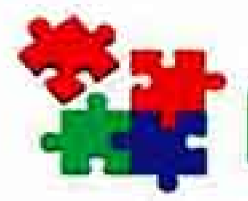
Elements of a set

The objects which a set contains are called "the elements of the set".

For Example :

- The elements of the set of digits in the number 531 are : 5 , 3 and 1
- The elements of the set of days of the week are :

Sunday , Monday , Tuesday , Wednesday , Thursday , Friday and Saturday.





- **State which of the following is a set or not and if it is a set, write its elements :**

  [a] Prime numbers between 2 and 20

  [b] Digits of the number 30043

  [c] The name of the clever students in your class.

  [d] Letters in the word "Egypt".



Exercise 11

What is a set ?

From the school book

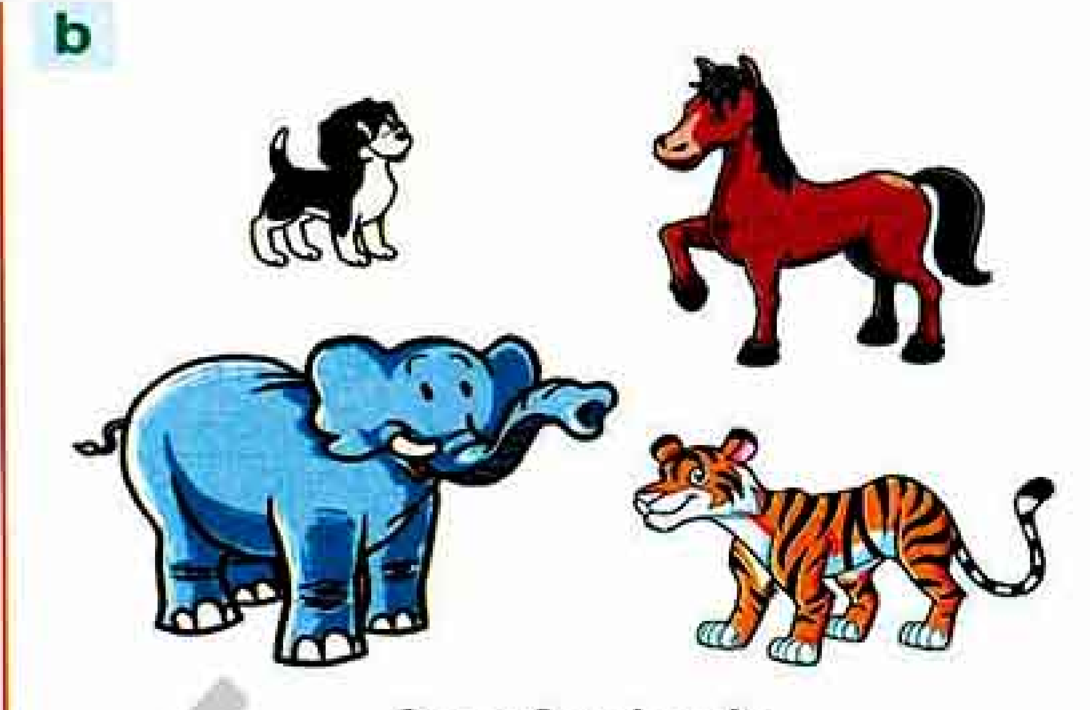
1 Mention the elements of each of the following sets :

a



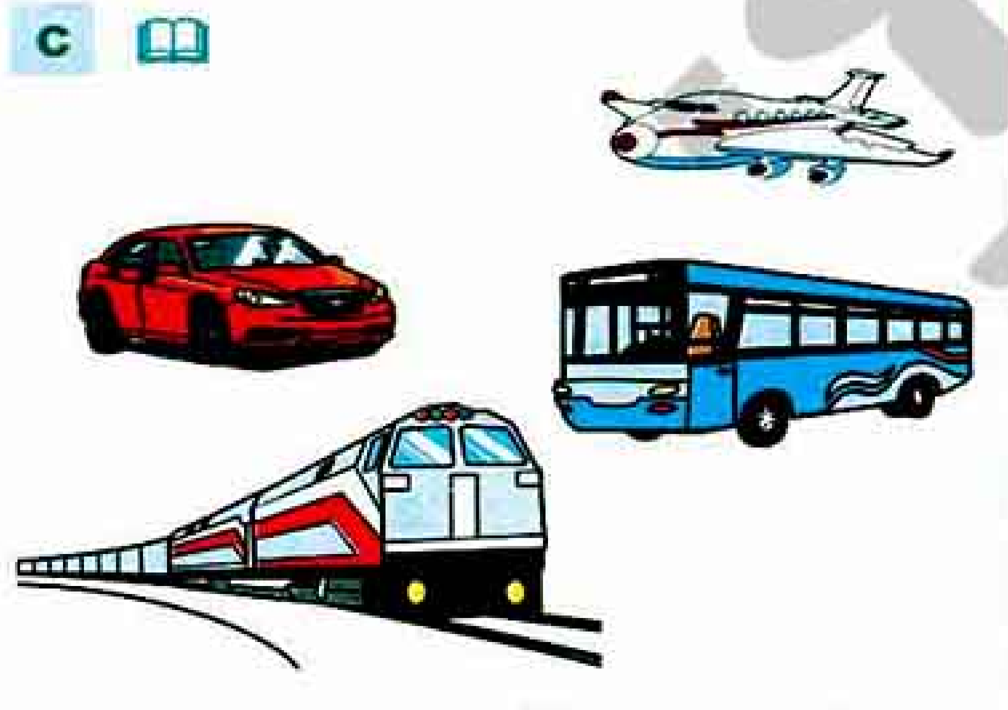
Set of fruits

b



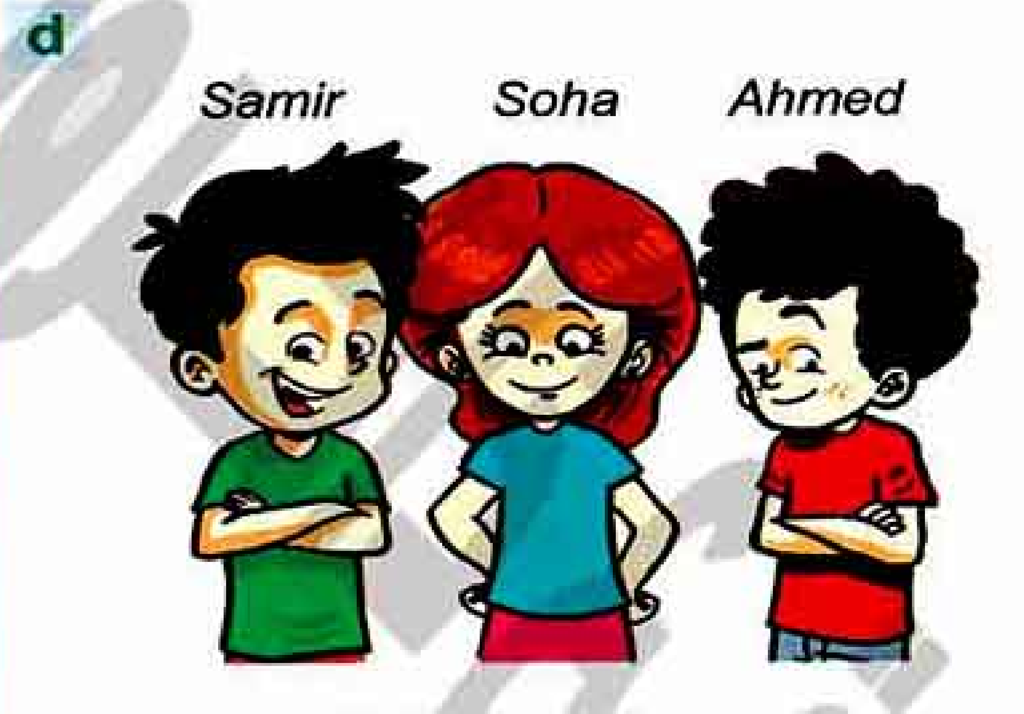
Set of animals

c



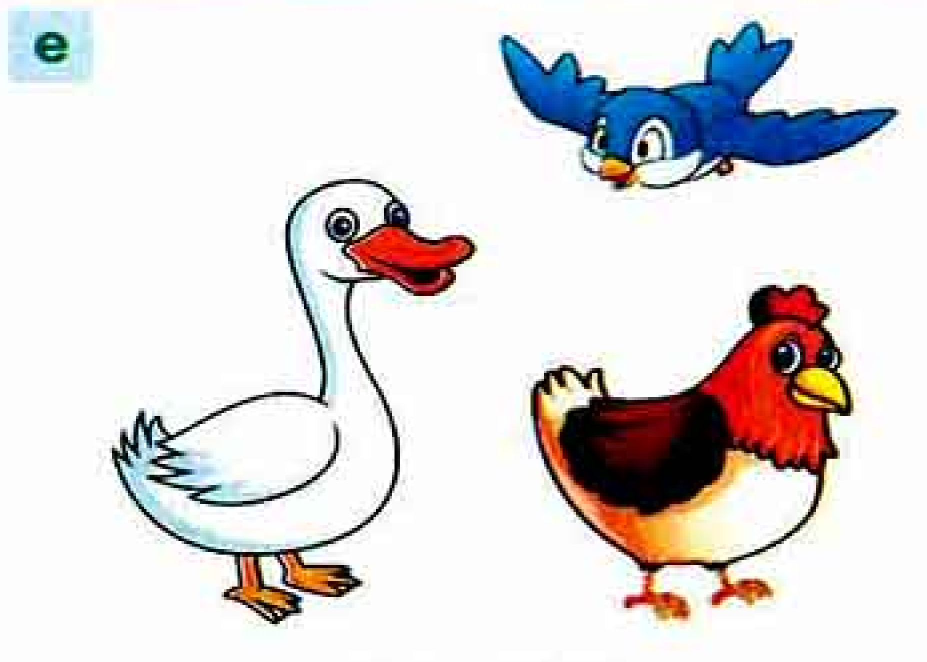
Set of means of transportation

d



Set of children

e



Set of birds

f



Set of balls



2 State which of the following is a set or not and why ?

a The colours of the Egyptian flag.

b Beautiful cities in Egypt.

c 📖 The beautiful stories.

d The fingers on your left hand.

e Rainbow colours.

f Intelligent pupils in the class.

g Digits of the number 1982

h 📖 Months in the Hejira calendar.

i The letters in the English alphabet.

j 📖 The letters of the word "Egypt".

k Things in your bag.

l Arabic countries.

m Big numbers.

n Even numbers between 11 and 20

o 📖 Prime numbers between 5 and 25

p Days of the week.

q Months of the Christian year whose days are less than 31 days.

r The players of the national football team in 2020

s 📖 The tall students in your class.

t Clever people living in Egypt.

u 📖 Seasons of the year.

v Fruits you have eaten in the last 12 hours.

w Presidents of Egypt since 1952

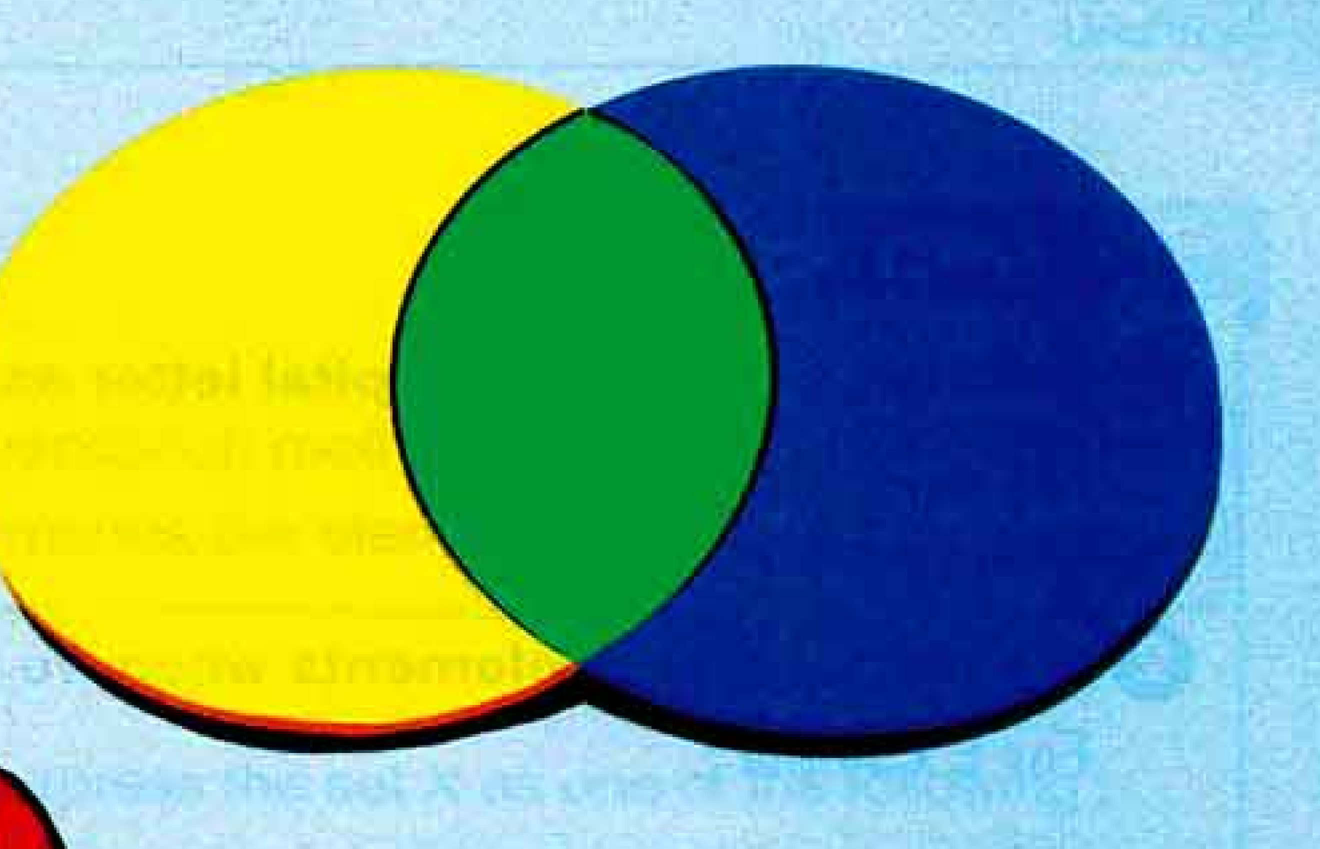
x Good manners.

3 Write all the elements of each of the following sets :

- **a** 📖 The set of the digits in the number 3072
- **b** The set of letters of the word "element".
- **c** 📖 The set of the colours in the Egyptian flag.
- **d** The set of the main directions.
- **e** The set of even numbers between 4 and 9
- **f** The set of odd numbers less than 10
- **g** The set of whole numbers between 5 and 15
- **h** 📖 The set of the days of the week.
- **i** 📖 The set of the year's months that have less than 30 days.
- **j** Months of the Christian year beginning with the letter "A"
- **k** The numbers which consisting of two digits whose unit is 9
- **l** 📖 The set of 2-digit numbers and each is like the other.
- **m** The set of 3-digit numbers and each is like the other.
- **n** The set of months of the Christian year.
- **o** 📖 The set of the months of the Hejri year.
- **p** The set of prime factors of 12
- **q** The set of factors of 12







2 Lesson — Mathematical expression of a set - Representing sets by Venn diagrams

Mathematical expression of a set



There are **two ways** of expressing a set

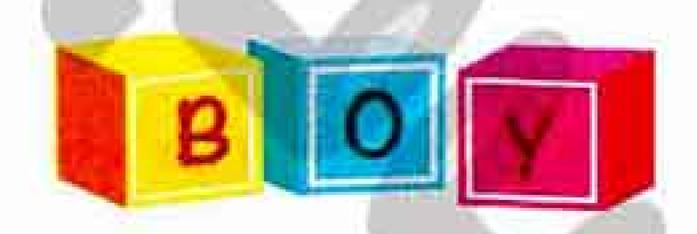
1. The listing method.
2. The description method.

First — The listing method

To express a set using the listing method , write all the elements of the set between **two braces** as { } , then place a **comma** "," between every two elements.

For Example :

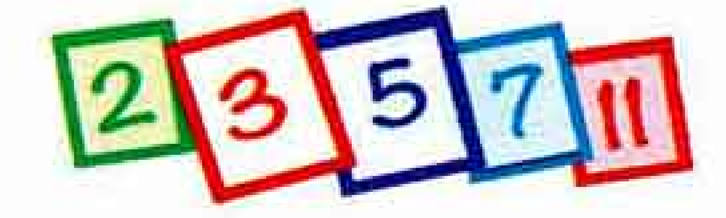
- The set of **letters in the word "boy"** is {b , o , y}



- The set of **odd numbers between 2 and 11** is {3 , 5 , 7 , 9}



- The set of **prime numbers less than 13** is {2 , 3 , 5 , 7 , 11}



Remarks

1. Sets are denoted with **capital letter** as : X , Y , Z , A , ...
   For Example :
   If A is the set of even numbers between 3 and 10 , then : A = {4 , 6 , 8}

2. We **do not repeat elements** when we list the elements of a set.
   For Example :
   The set of digits of the number 2010 is {2 , 0 , 1} not {2 , 0 , 1 , 0}

3. **The order** of elements is **not important** in the set , so the elements of a set may be written in any order.
   For Example :
   The set of digits of the number 13 is {1 , 3} or {3 , 1}

Example 1

Express each of the following sets by using the listing method :

[a] A = the set of colours of the Egyptian flag.

[b] B = the set of 1-digit odd numbers.

[c] X = the set of letters in the word "mathematics".

[d] Y = the set of digits in the number 7

[e] Z = the set of even numbers.

Solution

[a] A = {White , Red , Black}

[b] B = {1 , 3 , 5 , 7 , 9}

[c] X = {m , a , t , h , e , i , c , s}

[d] Y = {7}

[e] Z = {0 , 2 , 4 , 6 , ...}

Notice

We put ... because we cannot write all even numbers.





Second The description method

To express a set using the description method , we define the property which distinguishes and determines the elements of this set.

For Example :

If X = {r , a , t} , then we can express the set X as one of the following :

- X = the set of letters of the word "rat".
- X = the set of letters of the word "art".





Remark

The previous set X can be written in the following form :

X = {x : x is one of the letters of the word "art"}

It is read as :

X is a set of each x where x is one of the letters of the word "art".

Example 2

Express each of the following sets by using the discription method :

[a] A = {Summer , Winter , Autumn , Spring}

[b] B = {2 , 4 , 6 , 8} **[c]** C = {5} **[d]** D = {6 , 9 , 12 , 15}

Solution

[a] A = the set of the seasons of the year.

or we can write :

A = {a : a is one of the seasons of the year}

[b] B = the set of 1-digit even numbers and greater than 1

or = the set of digits of the number 6284

or = {b : b one digit of the number 68224}







[c] C = the set of digits in the number 55

or = {x : x is number 5}

[d] D = the set of multiples of 3 between 3 and 18

or = {y : y is a multiple of 3 between 3 and 18}




- **Complete the following table :**

	Listing method	Description method
[a]	....	The set of letters of the word "Mina".
[b]	{c , r , a , e}	....
[c]	....	The set of digits of the number 1133
[d]	{2 , 3 , 5 , 7}	....

Representing sets by Venn diagrams

We represent every element of a set by putting a point or a mark as "X" , then we surround them by a suitable geometric shape as a triangle , a square , a circle or any closed curve. These geometric shapes are called **"Venn diagrams"** related to the English scientist **"John Venn"**.

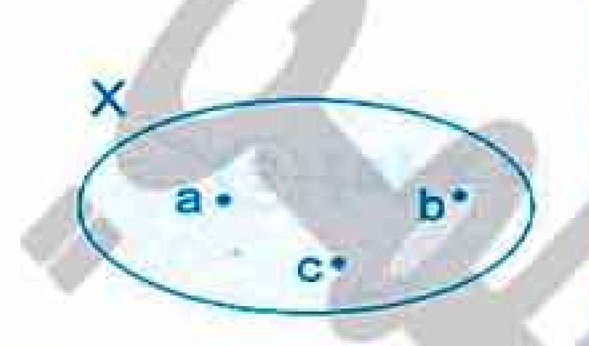

John Venn

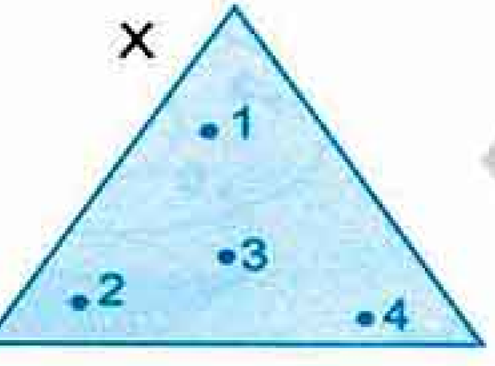




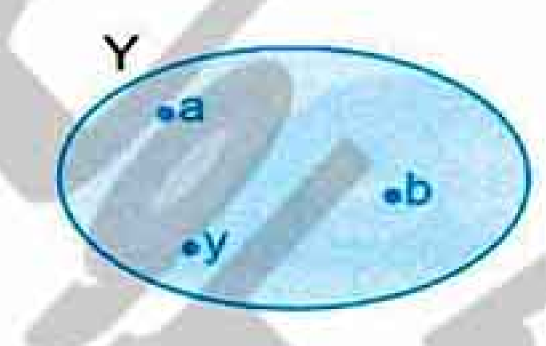
The following gives some figures of **Venn diagrams** for some sets :

X = {a , b , c}





Y = the set of digits of the number 4315



Z = the set of days of the week

Z

- Saturday
- Sunday
- Monday
- Tuesday
- Wednesday
- Thursday
- Friday

Example (3)

Represent each of the following sets by a Venn diagram :

[a] X = {1 , 2 , 3 , 4} **[b]** Y = The set of letters in the word "baby".

Solution

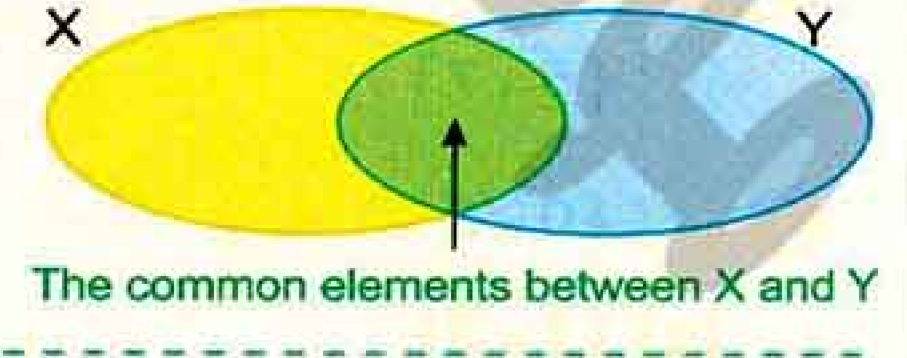
[a] (X: 1, 2, 3, 4)

[b] (Y: a, b, y)

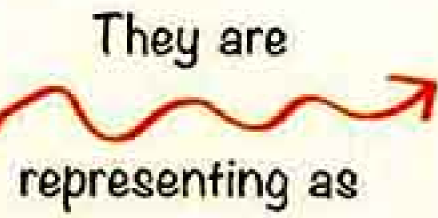
Remark

For any two different sets, there are three possibilities :

1. All elements of **X** are different from all elements of **Y** — They are representing as

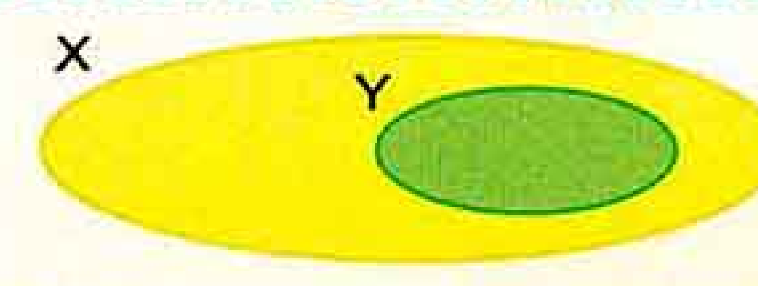


2. The two sets **X** and **Y** have some elements in common. — They are representing as



The common elements between X and Y

3. Each element of **Y** exists also in **X** — They are representing as



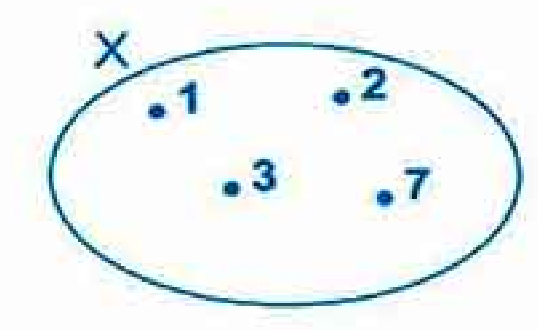




Example 4

Complete the following :

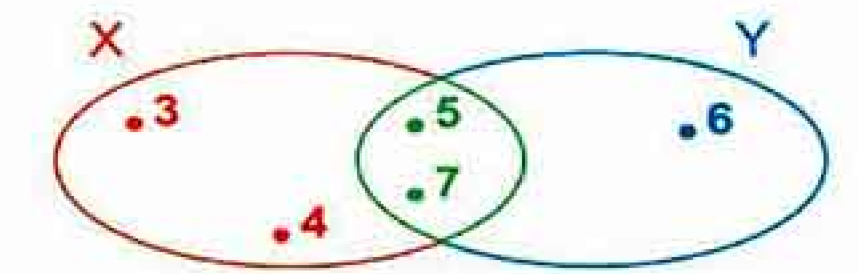
1 In the opposite figure :



[a] X = ... "by listing method"

[b] X = ... "by description method"

2 In the opposite figure :

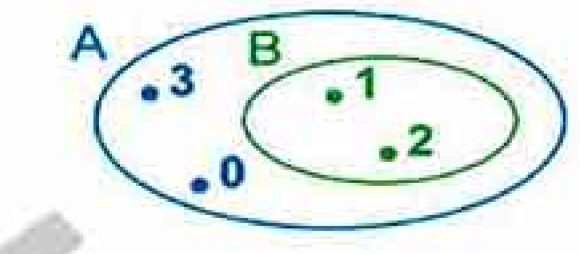


[a] X = {........................}

[b] Y = {........................}

[c] The set of elements found in X and Y is {........................}

3 In the opposite figure :



[a] A = {........................}

[b] B = {........................}

[c] The set of elements found in A and B is {........................}

[d] The set of elements found in A but not found in B is {........................}



Solution

1 [a] {1 , 2 , 3 , 7} [b] The set of digits of the number 1327

2 [a] {3 , 4 , 5 , 7} [b] {5 , 7 , 6}

[c] {5 , 7}

3 [a] {0 , 3 , 1 , 2} [b] {1 , 2}

[c] {1 , 2} [d] {0 , 3}

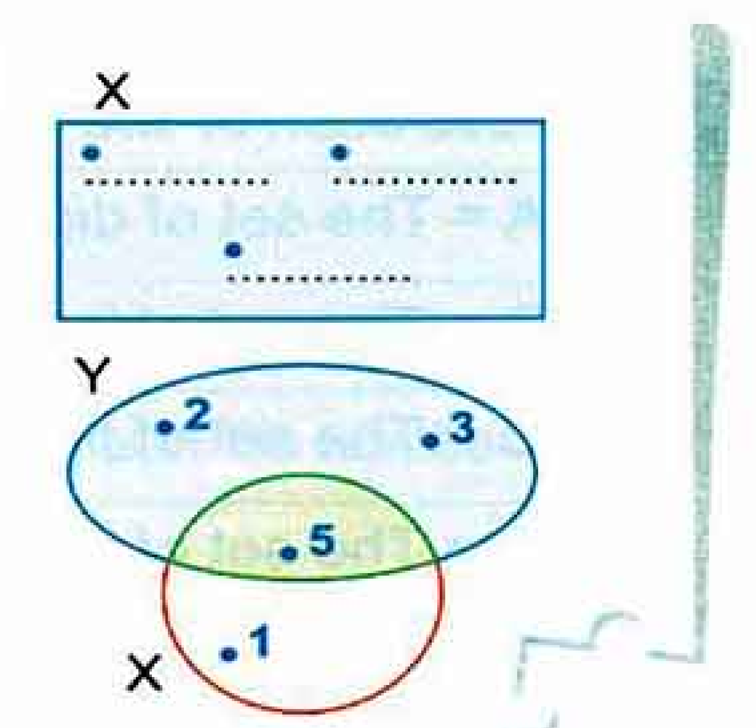






Try by yourself

- Using the opposite figures , complete :



(1) X = {a , c , d}

(2) [a] X = {........................}

[b] Y = {........................}

[c] The set of the common elements between X and Y = ...







Exercise 12

Mathematical expression of a set - Representing sets by Venn diagrams

From the school book

1 Express each of the following sets by using the listing method :

a A = The set of digits of the number 3501

b B = The set of letters of the word "address".

c C = The set of the days of the week.

d D = The set of months of the year beginning with "J"

e E = The set of the original four directions.

f F = The set of the rivers in Egypt.

g G = The set of numbers on a dice.

h H = The set of the first five letters of the English alphabet.

i I = The set of digits of the number 9

j J = The set of prime numbers between 4 and 15

k K = The set of odd numbers which are greater than 2 and less than 10

l L = The set of even numbers greater than 6

m M = The set of 2-digit numbers which are divisible by 11

2 Express each of the following sets by using the description method :

a $A = \{z, i, a, e, b, n\}$

b $B = \{a, l, i\}$

c $X = \{2, 4, 6, 8\}$

d $Z = \{2, 3, 5, 7\}$

e $Y = \{5, 10, 15\}$

f $G = \{2, 3, 5, 7, 11\}$

g $H = \{16, 18, 20\}$

h C = {Winter , Spring , Summer , Autumn}

i $E = \{6\}$

j F = {February}





3 Complete the table to express the following sets :

	The listing method	The description method
a	{c , a , r}	The set of the letters forming the word "car".
b	{East , West , North , South}	....
c	{........................}	The set of the colours forming Egypt's flag.
d	{........................}	The set of the digits in the number 46421
e	{Abo Bakr , Omar , Othman , Ali}	....
f	{........................}	The set of the letters of the word "Series".
g	{2 , 4 , 6 , 8 , 10}	....

4 Represent each of the following sets by a Venn diagram :

a X = {1 , 2 , 3}

b Y = {a , b , c , f}

c B = { △ , □ , ○ }

d Z = The set of the letters forming the word "stairs".

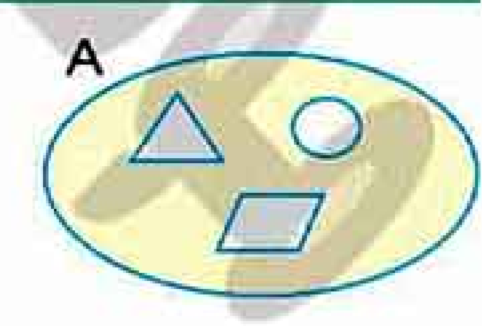
e L = The set of whole numbers smaller than 5

f N = The set of letters of the word "dad".

g M = The set of months of the Christian year ending by " r ".

5 Complete the following :

a A = {............ , ... , ...}

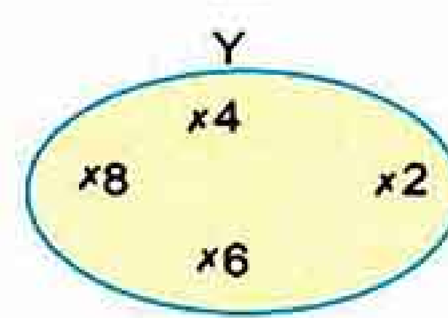


b In the opposite figure :



(1) The listing method : Y = {....................}

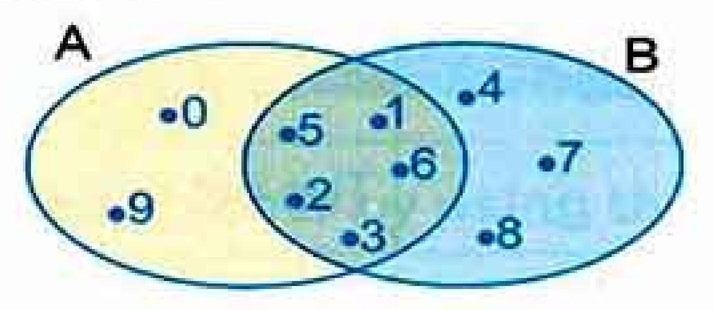
(2) The description method is : ....







6 List the elements of each of the sets A and B :



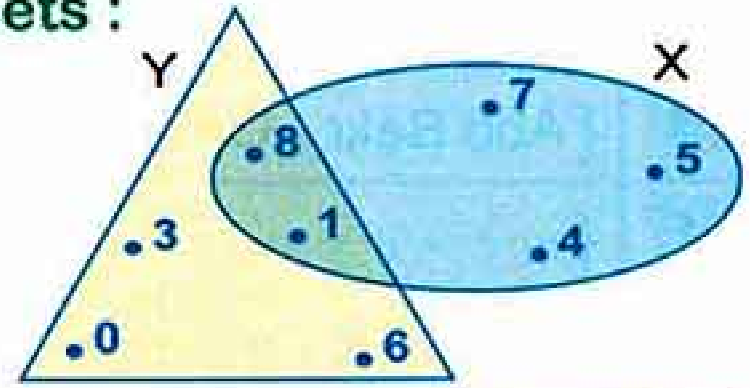
A = {..................} , B = {..................}

7 List the elements of each of the following sets :

X = {..................}

Y = {..................}

The set of the elements found in X and Y is ....



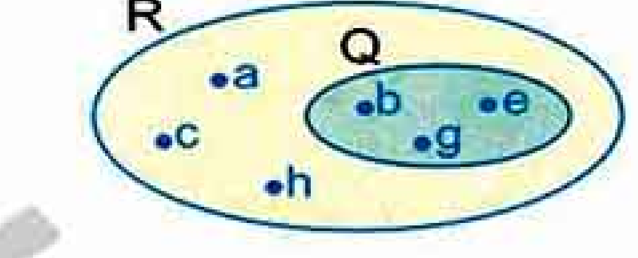
8 Considering the Venn diagram beside , answer the following questions :

a List the elements of R

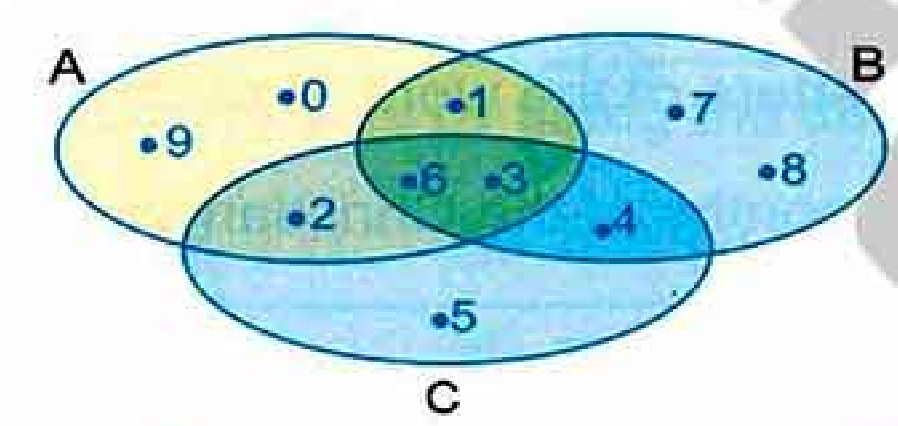
b List the elements of Q

c List the elements which are in R and not in Q

d Z is the set of the elements which are in Q and not in R , what can you say about Z ?



9 Using the Venn diagram below , list the elements of each of the following :



a A = {..................} b B = {..................} c C = {..................}

d The set of the elements found in A and B = ...

e The set of the elements found in B and C = ...

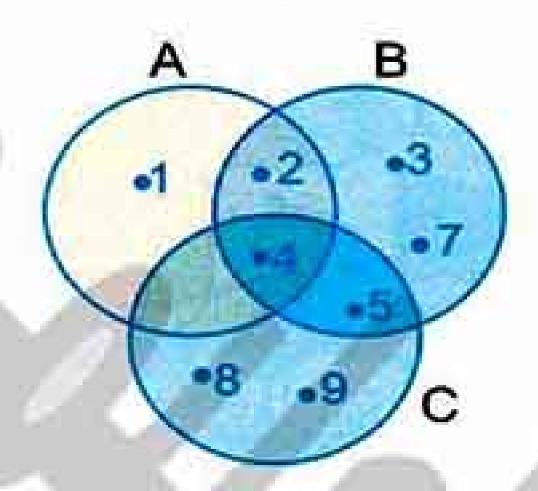
f The set of the elements found in A and C = ...

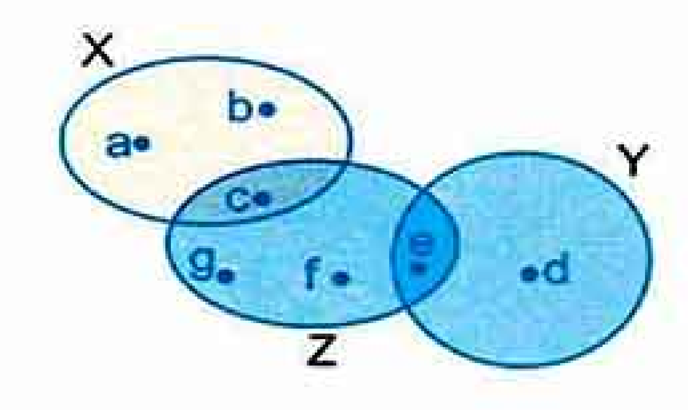
g The set of the elements found in A , B and C = ...





10 There may be more than two loops in a Venn diagram, they may overlap or intersect in many different ways. Two possible ways are shown.



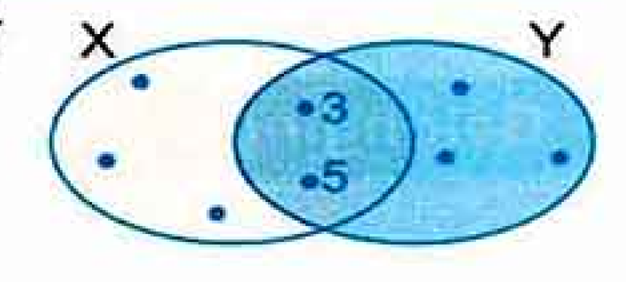


a What number is in both A and B, but not in C?

b What numbers are in C but not in A or B?

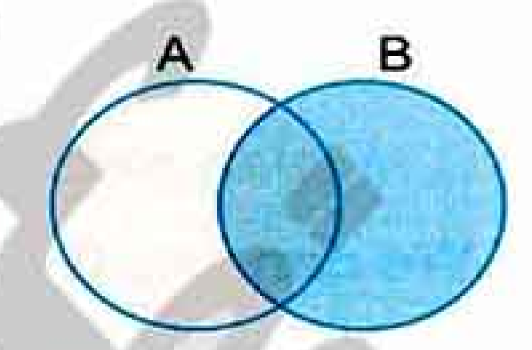
c What letter is not in X but is in Y and Z?

11 X = {7, 9, 15, 3, 5} and Y = {3, 5, 11, 13, 19}
Then the opposite figure represents the two sets X and Y, complete the Venn diagram.





12 Complete the opposite figure to be a Venn diagram for the two sets A and B where
A = {2, 4, 6, 8} and B = {3, 4, 5, 6, 7}



13 Let A = {2, 3, 4, 5}, B = {5, 6, 7, 8} and C = {4, 5, 9}
Draw a Venn diagram to represent these sets, then find:

a The common elements in A and C

b The common elements in B and C

c The common elements in A, B and C



3 Lesson
Belonging of an element to a set - Types of sets

Belonging of an element to a set

If a is an element of a set X, we can write $a \in X$, the symbol $\in$ means "belong to".

For Example :

If X is the set of colours of **the Egyptian flag**,
then : X = {red , white , black}

- Red is an element of the set X

  We can say that : red belongs to the set X

  and we symbolize that as : red $\in$ X

- Blue is not an element of the set X

  We can say that : blue does not belong to the set X

  and we symbolize that as : blue $\notin$ X

The symbols

$\in$ denotes "the **belonging** of an element to a set".

$\notin$ denotes "the **not belonging** of an element to a set".

For Example :

If Y = {2 , 3 , 5} , then :

2 ∈ Y , 3 ∈ Y , 5 ∈ Y and 4 ∉ Y , 0 ∉ Y , 6 ∉ Y

Example 1

Put the suitable sign "∈ or ∉" :

[a] 2 .... {2} , while 2 .... {22}

[b] 6 .... {6 , 36} , while 6 .... {16 , 36}

[c] b .... the set of letters of the word "book" , while b .... {book}

[d] 25 .... the set of digits of the number 2525

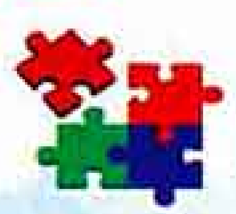
[e] 15 .... {1 , 5}

[f] 7 .... the set of days of the week.

Solution

[a] ∈ , ∉ | [b] ∈ , ∉ | [c] ∈ , ∉

[d] ∉ | [e] ∉ | [f] ∉



Try by yourself

- **If X = {1 , 2 , 5 , 7} and Y = {0 , 5}**

Put the suitable sign "∈ or ∉" :

[a] 2 .... X | [b] 0 .... Y

[c] 15 .... X | [d] 7 .... Y

[e] 5 .... X | [f] 5 .... Y

Example 2

Find the value of x in each of the following :

[a] $2 \in \{x , 3\}$ [b] $4 \in \{3 , x + 1 , 5\}$

[c] $x \in \{2 , 3 , 5\}$ and x belongs also to the factors of number 9



Solution

[a] Since $2 \in \{x , 3\}$, then 2 is an element in the given set
i.e. $x = 2$

[b] Since $4 \in \{3 , x + 1 , 5\}$, then 4 is an element in the given set
i.e. $x + 1 = 4$, therefore $x = 3$

[c] Since $x \in \{2 , 3 , 5\}$, then x equals 2 , 3 or 5
but x belongs also to the factors of number 9
, then $x = 3$



- **Complete the following :**

[a] If $4 \in \{2 , 5 , x\}$, then $x =$ ....

[b] If $3 \in \{5 , x + 2\}$, then $x =$ ....

[c] If $x \in \{0 , 2 , 5 , 6\}$ and belongs also to the odd numbers
, then $x =$ ....



Types of sets

There are **three types of sets**

1. Finite set — 2. Infinite set — 3. Null set

1 Finite set

A finite set is a set has a limited number of elements.
i.e. The number of its elements can be listed.

Examples of finite sets :

- The set $\{3 , 5\}$ is a finite set because
  the number of its elements is 2



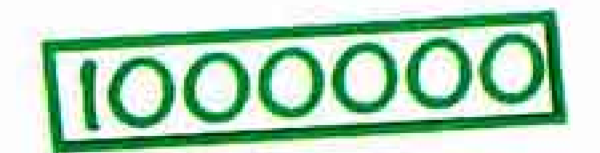




- The set of **names of the days of a week** is a finite set because the number of its elements is 7

SAT SUN MON TUE WED THU FRI

- The set of **counting numbers to million** is a finite set because the number of its elements is million.



2 Infinite set

An infinite set is a set has an unlimited number of elements.
i.e. The number of its elements cannot be listed.

Examples of infinite sets :

- The set of **counting numbers** = {1 , 2 , 3 , 4 , ⋯}
- The set of **even numbers** = {0 , 2 , 4 , 6 , 8 , ⋯}
- The set of **odd numbers** = {1 , 3 , 5 , 7 , ⋯}
- The set of **prime numbers** = {2 , 3 , 5 , 7 , ⋯}

Notice

A row of dots ... is used to show that more numbers follow, but they have not all been listed.

3 The null (empty) set

The null set is the set that has no elements.
It is denoted by symbol { } or ∅ which is read as "phi"

Examples of a null set :

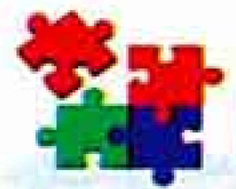
- The set of **your class pupils who visited the moon.**
- The set of **the whole numbers between 7 and 8**
- The set of **the even digits of the number 9357**





Remarks

1. {0} is not an empty set , it is a set which has one element which is **0**
2. **The empty set** "∅" is a finite set , the number of its elements is **0**





- **Put (✓) in front of each set to get the correct choice :**

The set	Finite	Infinite	Empty
[a] {5 , 2 , 4 , 0}	....	....	....
[b] The set of odd numbers	....	....	....
[c] The set of even numbers between 4 and 6	....	....	....





Exercise 13

From the school book

Belonging of an element to a set - Types of sets

1 Write each of the following sentences using one of the symbols $\in$ or $\notin$ as [a] :

The sentence	The symbol
a 6 is an element of the set X	$6 \in X$
b 5 belongs to the set Y	....
c B does not belong to the set M	....
d 7 does not belong to the set N	....
e B is an element of the set K	....

2 Complete using the suitable sign "$\in$ or $\notin$" :

a 3 .... {3 , 5}

b 2 .... {3 , 1 , 7}

c 15 .... {5 , 7 , 13}

d m .... {x , m , ℓ}

e △ .... {○ , □ , △}

f (car) .... {(ship) , (plane) , (bicycle)}

g 17 .... {7 , 17}

h 12 .... {1 , 2}

i 6 .... {66}

j 99 .... {99}

k 0 .... {30 , 40}

l 3 .... {13 , 33 , 330}

m 69 .... {9 , 6 , 96}

n 11 .... {5116}

o m .... {Mohamed}

p $\frac{2}{5}$ .... {2 , 5}

3 Complete using "$\in$ or $\notin$" :

a Y .... the set of the letters forming the word "Egypt".

b 3 .... the set of digits in the number 481

c 20 .... the set of digits in 2020

d 3 .... the set of odd numbers.

e 2.5 .... the set of whole numbers.



f March .... the set of the seasons of the year.

g 7 .... the set of the days of the week.

h 15 .... the set of the numbers which are multiples of 4

i 4 .... the set of the even numbers between 3 and 5

j 25 .... the set of the odd numbers less than 25

4 If X is a set where X = {2 , 3 , 5 , 6}
Place the suitable symbol $\in$ or $\notin$ in the blanks to make each sentence true :

a 3 ☐ X	b 5 ☐ X	c 7 ☐ X	d 6 ☐ X
e 0 ☐ X	f 2 ☐ X	g 1 ☐ X	h 32 ☐ X

5 If A = {1 , 3 , 5 , 7 , 9} and B = {0 , 2 , 4 , 6 , 8 } , put the suitable symbol $\in$ or $\notin$:

a 1 ☐ A
b 8 ☐ B
c 9 ☐ B
d 13 ☐ A
e 7 ☐ B
f 10 ☐ B

6 If C = all prime numbers , which of the following statements are true ?

a $7 \in C$
b $51 \in C$
c $24 \notin C$
d $97 \notin C$
e $23 \in C$
f $31 \notin C$

7 Complete :

a If $4 \in \{2 , x , 5\}$, then $x =$ ....

b If $5 \in \{7 , 9 , x\}$, then $x =$ ....

c If $x \in \{5 , 7\}$, then $x =$ ....

d If $x - 1 \in \{6\}$, then $x =$ ....



e If $6 \in \{5 , x + 1\}$, then $x =$ ....

f If $5 \in \{3 , 4 + x\}$, then $x =$ ....

g .... $\in \{3 , 5 , 10\}$ and belongs also to the set of prime factors of the number 6

h If $x \in \{2 , 5 , 7\}$ and belongs also to the set of digits of the number 352 , then $x =$ ....

8 **Put in front of each set one of the two words "null" or "not null" :**

a The set of months of the Christian year of days which are more than 30 days. ☐

b The set of Arabic countries in Australia. ☐

c The set of Egyptian governorates in Asia. ☐

d The set of students in your class who made a trip to the moon. ☐

e The set of the governorates in Upper Egypt that are located on the Mediterranean Sea. ☐

f The set of triangles having 4 sides. ☐

g The set of even numbers less than 2 ☐

h The set of prime factors of 7 ☐

i The set of odd numbers between 7 and 9 ☐

j The set of those numbers divisible by 7 and are between 8 , 15 ☐

k The set of the factors of 15 which are divisible by 2 ☐

l The set of those numbers divisible by 5 and are between 5 , 10 ☐



9 Which of these sets is a finite set and which of them is an infinite set ? Write the number of elements of every finite set as in [a] :

The set	Finite	Number of elements	Infinite
a The set of days in a week.	✓	7	×
b {0 , 3 , 6 , 9 , 12}	....	....	....
c {30 , 32 , 34 , ...}	....	....	....
d {1 , 3 , 5 , ... , 99}	....	....	....
e The set of the months in a Gregorian year.	....	....	....
f The set of dinosaurs in the zoo.	....	....	....
g The set of pages of this book.	....	....	....
h The set of the odd numbers.	....	....	....
i The set of cats with 3 heads.	....	....	....
j The set of alphabet in the English language.	....	....	....
k The set of multiples of the number 5	....	....	....
l The set of prime numbers less than 20	....	....	....
m The set of factors of the number 3	....	....	....
n The set of prime even numbers.	....	....	....
o The set of the letters forming the word "Sondos".	....	....	....
p The set of counting number less than 10000	....	....	....
q The set of counting numbers greater than 10000	....	....	....
r The set of whole numbers which are divisible by 3	....	....	....





Challenge

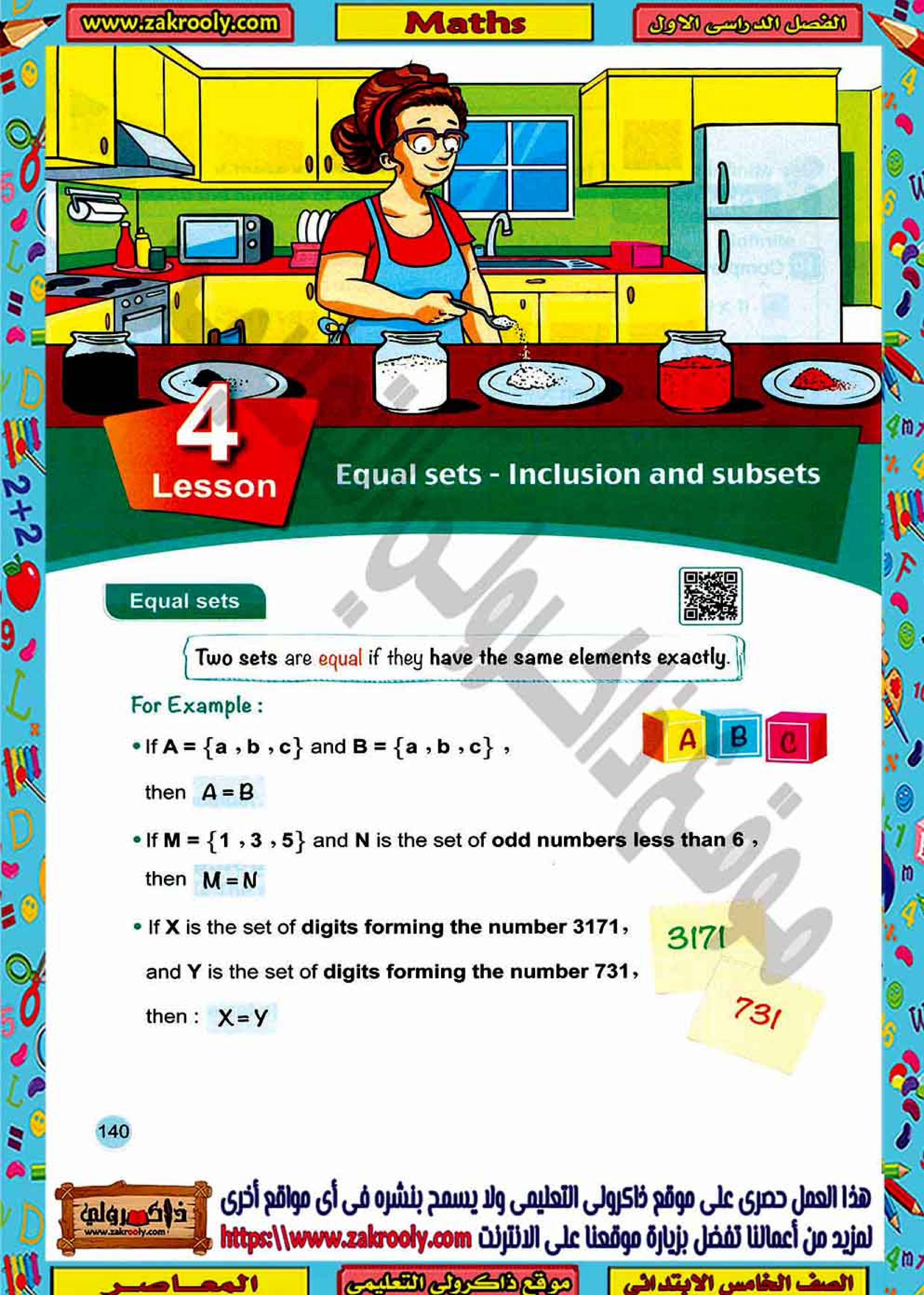
10 Complete :

a. If $x \notin \{7, 9\}$, then $x =$ ....

b. If $2 \notin \{1, x, 4\}$, then $x =$ ....

c. If $x \notin \{3, 5\}$, then $x \neq$ ....

d. If $3 \notin \{6, x+1, 5\}$, then $x \neq$ ....



4 Lesson Equal sets - Inclusion and subsets

Equal sets

Two sets are equal if they have the same elements exactly.

For Example :

- If **A** = {a , b , c} and **B** = {a , b , c} ,

  then A = B

- If **M** = {1 , 3 , 5} and **N** is the set of **odd numbers less than 6** ,

  then M = N

- If **X** is the set of **digits forming the number 3171**,

  and **Y** is the set of **digits forming the number 731**,

  then : X = Y

Example 1



Let X be the set of letters of the word "set" and Y be the set of letters of the word "test". Is X = Y ? Give reason.

Solution

Since X = {s , e , t} and Y = {t , e , s}
Then X = Y because X and Y contain exactly the same elements , which are t , e and s

Example 2

*Let A be the set of the odd numbers between 0 and 6 and B be the set of the digits of the number 251
Is A = B ? Give reason.*

Solution

Since A = {1 , 3 , 5} and B = {2 , 5 , 1}
Then A ≠ B because A and B do not contain exactly the same elements.

Notice

- $3 \in A$ but $3 \notin B$
- $2 \notin A$ but $2 \in B$

Try by yourself

- **Put (✓) for the true sentence and (x) for the false one :**
  [a] {2 , 1 , 17} = the set of digits of number 2117 ( )
  [b] {5 , 7 , 4} = {4 , 7 , 5} ( )
  [c] {2 , 4 , 6 , 8} = the set of even numbers less than 10 ( )





Lesson 4

Example 3

In each of the following , find the values of x and y :

[a] $\{5, 7\} = \{7, x\}$

[b] $\{2, x\} = \{3, y\}$

[c] $\{4, x, 9\} = \{y, 4, 8\}$

[d] $\{x - 1, 5\} = \{y + 1, 6\}$

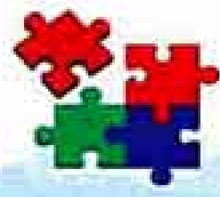
Solution

[a] $x = 5$

[b] $x = 3$ and $y = 2$

[c] $x = 8$ and $y = 9$

[d] $x - 1 = 6$, then $x = 7$ and $y + 1 = 5$, then $y = 4$



Try by yourself

- **Complete the following :**

  [a] If $\{2, 3, 4\} = \{x, 4, 2\}$, then $x =$ ....

  [b] If $\{5, 2, x\} = \{y, 6, 2\}$, then $x =$ ....

  , $y =$ ....

  [c] If $\{6, x - 1\} = \{3, 6\}$, then $x =$ ....

Inclusion and subsets

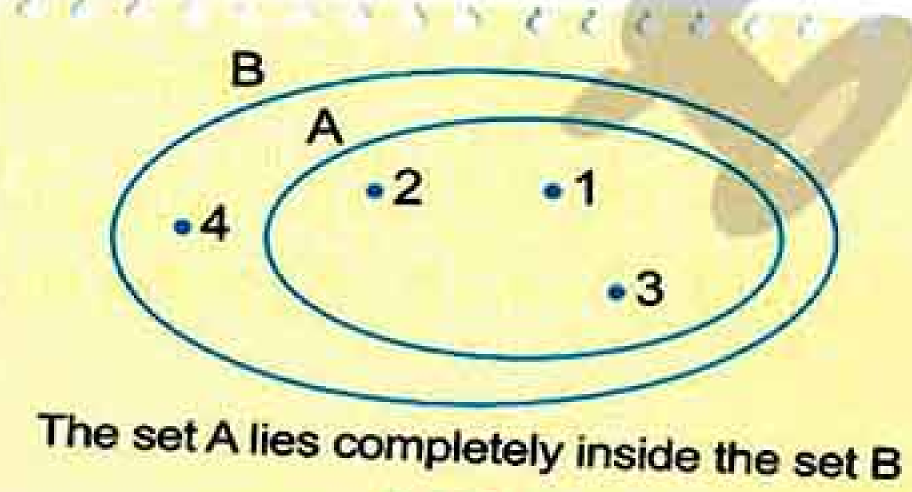
If all the elements of set A are also elements of set B , then A is subset of B

For Example :

If $A = \{1, 2, 3\}$ and $B = \{1, 2, 3, 4\}$

Then "**A** is a subset of **B**" or "**A** is included in B" and we write it as "$A \subset B$" where the symbol "$\subset$" denotes the inclusion of one set in another set.

We represent that by the following Venn diagram.



The set A lies completely inside the set B

$A \subset B$



Remark

"C is not a subset of B" if there is at least one element in C but not an element in B and we write "C $\not\subset$ B"
where the symbol "$\not\subset$" denotes the non inclusion of a set in another set.

For Example :

If B = {2 , 5 , 7 , 8} , A = {2 , 7} , C = {2 , 5 , 3} and
D = {2 , 5 , 7 , 8 , 9} , then :

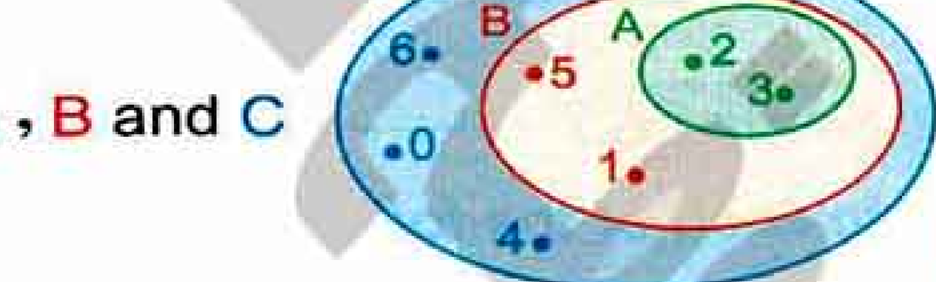
- A $\subset$ B because each element in A is also an element in B
- C $\not\subset$ B because 3 $\in$ C but 3 $\notin$ B
- D $\not\subset$ B because 9 $\in$ D but 9 $\notin$ B

Remarks

1. The empty set $\varnothing$ is a subset of any set
   For Example : $\varnothing \subset \{a , b , c\}$, $\varnothing \subset \{1 , 2 , 3 , ...\}$, $\varnothing \subset \{0\}$
2. Any set is a subset of itself "X $\subset$ X"
   For Example : $\{1 , 2\} \subset \{2 , 1\}$

Example (4)

In the opposite Venn diagram :



[a] List the elements of the three sets A , B and C
[b] Put the suitable sign ($\subset$ or $\not\subset$) :

(1) A C	(2) A .... B	(3) C .... B
(4) B C	(5) B .... A	(6) C .... A

Solution

[a] A = {2 , 3} , B = {2 , 3 , 1 , 5} and C = {2 , 3 , 1 , 5 , 0 , 4 , 6}

[b]

(1) $\subset$	(2) $\subset$	(3) $\not\subset$
(4) $\subset$	(5) $\not\subset$	(6) $\not\subset$



Lesson 4

Remarks

1. The two symbols $\in$ and $\notin$ refer to the **relation between an element and a set.**
2. The two symbols $\subset$ and $\not\subset$ refer to the **relation between two sets.**

For Example :

- $5 \in \{2, 5, 7\}$ and $\{5\} \subset \{2, 5, 7\}$
- $6 \notin \{2, 3, 4\}$ and $\{6\} \not\subset \{2, 3, 4\}$

Example 5

Put the suitable symbol "$\in$, $\notin$, $\subset$ or $\not\subset$" :

[a] 7 ………… $\{5, 7, 8, 9\}$

[b] $\{5\}$ ………… $\{55\}$

[c] 15 ………… $\{1, 6, 3, 2\}$

[d] $\{6, 2\}$ ………… $\{16, 62, 12\}$

[e] $\{2, 0\}$ ………… $\{0, 4, 2, 8\}$

[f] $\{5, 2, 0\}$ ………… $\varnothing$

[g] $\varnothing$ ………… $\{0, 2, 3, 4\}$

[h] $\{2, 1, 3\}$ ………… $\{1, 3, 2\}$

Solution

[a] $\in$ | [b] $\not\subset$ | [c] $\notin$ | [d] $\not\subset$

[e] $\subset$ | [f] $\not\subset$ | [g] $\subset$ | [h] $\subset$

Example 6

In each of the following , find the value of x to get a correct statement :

[a] $\{2, x\} \subset \{3, 2\}$

[b] $\{5, 6\} \subset \{5, 9, x\}$

[c] $\{3, 5\} \subset \{x + 3, 3\}$

[d] $\{2, x, 3\} \subset$ the set of digits of the number 3032

Solution

[a] $x = 3$

[b] $x = 6$

[c] Since $x + 3 = 5$, then $x = 2$

[d] $x = 0$





Example 7

Write down all the subsets of X = {2 , 0 , 7}

Solution

- The null set ∅
- The sets which have one element each : {0} , {2} , {7}
- The sets which have 2 elements each : {2 , 0} , {2 , 7} , {0 , 7}
- The set which have 3 elements each : {2 , 0 , 7} = X

Then the all subsets of X are :

∅ , {0} , {2} , {7} , {2 , 0} , {2 , 7} , {0 , 7} and {2 , 0 , 7}



- **Put the suitable symbol " ∈ , ∉ , ⊂ or ⊄ " :**

[a] 2 .... {12 , 22}

[b] {3 , 4} .... {7 , 3 , 4}

[c] ∅ .... {7}

[d] 3.14 .... {3 , 4 , 1}

- **Write down all the subsets of X = {a , b}**



Exercise 14

From the school book

Equal sets - Inclusion and subsets

Equal sets

1 Put (✓) for the true statement and (✗) for the false one :

a $\{1, 2\} = \{2, 1\}$ ( )

b $\{5\} = \{5\}$ ( )

c $\{37\} = \{73\}$ ( )

d 📖 $\{1, 2, 5\} = \{21, 5\}$ ( )

e $\{43\} = \{4, 3\}$ ( )

f 📖 $\{0, 2, 4, 6\}$ = the set of the even numbers less than 6 ( )

g 📖 {r , a , c} = the set of the letters forming the word "car". ( )

h {m , a , t , h , s} = {maths} ( )

i 📖 $\{77, 99\}$ = the set of digits of 9977 ( )

j $\{12\}$ = the set of months of the year. ( )

k 📖 $\{1, 2, 3, 6\}$ = the factors of the number 6 ( )

2 📖 If X = the set of letters forming the word "Lab",
Y = the set of letters forming the word "ball", is X = Y ?

3 📖 Match the equal sets in the following columns :

$\{6, 8, 9\}$	The set of the letters forming the word "Ziwel"
$\{10, 12, 14, \cdots, 98\}$	The set of the digits of 9688
{3 , d}	{Summer , Winter , Spring , Autumn}
{z , i , e , w , l}	The set of the months in a year that have 35 days.
The set of the seasons of the year.	{d , 3}
$\varnothing$	The set of the even numbers that have 2 digits.





4 In each of the following , find the value of x :

a $\{x\} = \{3\}$

b $\{1, 4\} = \{x, 1\}$

c 📖 $\{3, 6, x\} = \{6, 3, 4\}$

d 📖 $\{x, 2, 7\}$ = the set of the digits in the number 2257

e $\{x + 5\} = \{9\}$

f $\{2, 4, x + 1\} = \{2, 5, 4\}$

g $\{6, x - 1\} = \{6, 3\}$

5 In each of the following , find the values of a and b that make each sentence true :

a 📖 $\{a, 7\} = \{b, 2\}$

b $\{5, a, 8\} = \{b, 9, 8\}$

c $\{a, 2\} = \{b - 3, 4\}$

6 If $\{x, 3, 4, 7\} = \{7, y, 6, 3\}$, then complete :

a $x - y =$ ....

b $x + y =$ ....

c $x \times y =$ ....

d $\frac{x}{y} =$ ....

7 Find the values of a , b and c if $\{4, a, 5\} = \{4, 7, b\} = \{c, 5, 7\}$

Inclusion and subsets

8 Fill in the blanks using one of the two symbols ($\subset$ or $\not\subset$) to make each sentence true :

a $\{1\}$ .... $\{1, 3\}$

b 📖 $\{7, 8\}$ .... $\{7, 9, 11\}$

c 📖 $\{1, 2\}$ .... $\{1, 2, 3\}$

d 📖 $\{2\}$ .... $\{2\}$

e 📖 $\{7\}$ .... $\{77\}$

f $\{4, 5\}$ .... $\{54\}$

g $\{3, 2\}$ .... $\{2, 3\}$

h $\{0, 1\}$ .... $\{10, 15\}$

i $\{37\}$ .... $\{73\}$

j $\{43, 42\}$ .... $\{40, 42\}$

k $\{0\}$ .... $\{100\}$

l $\{5, 2\}$ .... $\varnothing$

m $\varnothing$ .... $\{0\}$

n $\varnothing$ .... $\{1, 2, 3\}$





Lesson 4

o ∅ ………… { }

p {9 , 2} ………… the set of digits of the number 5992

q {m , a} ………… {maths} r {sets} ………… {s , e , t}

9 Complete the table :

	Set X	Set Y	Use ⊂ or ⊄
a	{7 , 9 , 10}	{6 , 7 , 8 , 9 , 10}	X ………… Y
b	{a , b , c}	{a , b , d , e}	X ………… Y
c	{1 , 2 , 3}	The set of the prime numbers	X ………… Y
d	The letters of "Ragb"	The letters of "Gabr"	X ………… Y
e	{January , March}	The months of the Gregorian year.	X ………… Y
f	{London}	The set of the capitals of all the world's countries.	X ………… Y

10 Put the suitable sign (∈ , ∉ , ⊂ or ⊄) :

a {2 , 3} ………… {1 , 2 , 3}

b {1 , 2} ………… {2 , 3 , 4}

c b ………… {b , c}

d {3} ………… {1 , 3 , 2}

e {a , b} ………… {b , a}

f 1 ………… {0 , 10}

g 2 ………… {22 , 44}

h {22} ………… {2}

i {38} ………… {6 , 3 , 8}

j 32 ………… {32}

k 0 ………… ∅

l {0} ………… ∅

m ∅ ………… {0}

n {3 , 5 , 6} ………… {3 , 5}

o 5 ………… the set of odd numbers.

p {1, 2} ………… the set of prime numbers.

q 52 ………… the set of digits of the number 5252

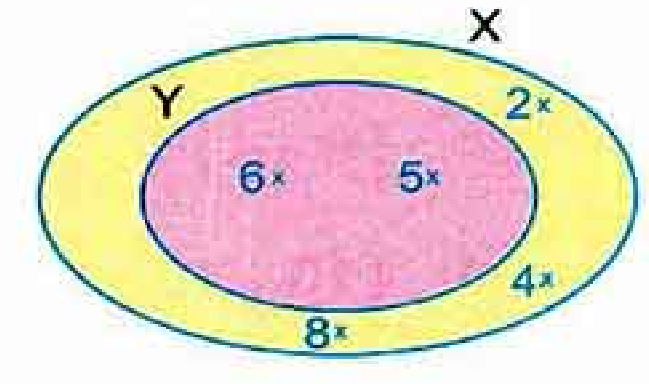
r The set of digits of the number 15 ………… {5 , 15}

s m ………… {Mohamed}

t {m} ………… the set of letters of the word "Ahmed".

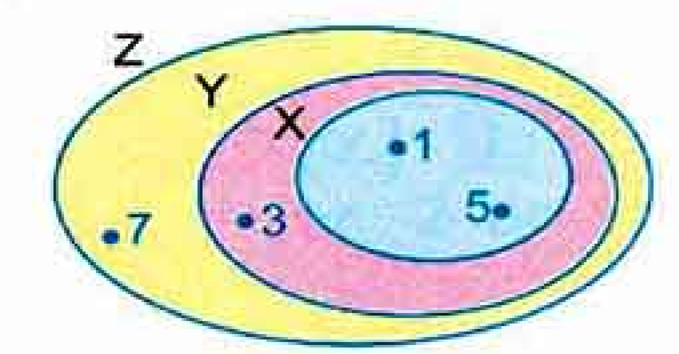


11 Look at the opposite Venn diagram, then complete the following using one of the symbols " $\in$, $\notin$, $\subset$ or $\not\subset$ " :



a Y .... X | b 2 X
c {5} .... Y | d 6 .... Y
e 4 .... X | f {6 , 8} X

12 In the opposite Venn diagram :



a List the elements of the three sets X , Y and Z :

(1) X = {...... , ...}

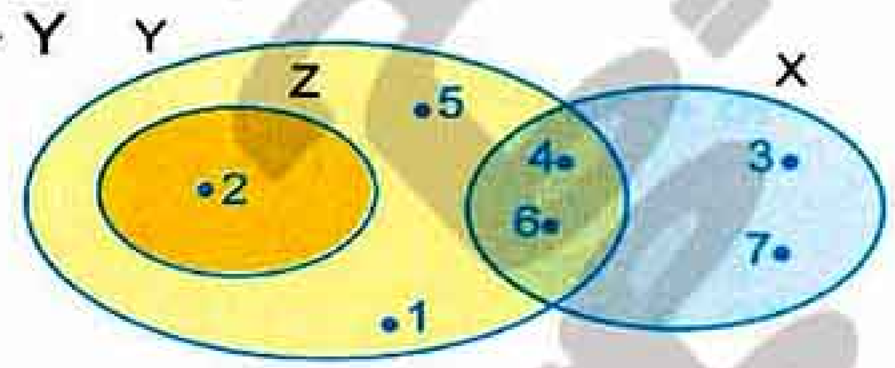
(2) Y = {...... , ... , ...}

(3) Z = {...... , ... , ... , ...}

b Put the suitable sign ($\subset$ or $\not\subset$) :

(1) X .... Y | (2) X .... Z
(3) Y .... X | (4) Y .... Z

13 By using the opposite Venn diagram, complete by using the suitable sign " $\subset$, $\not\subset$, $\in$ or $\notin$ " :



a 3 .... X | b {1 , 4} .... Y
c {1 , 6} .... X | d 5 .... Z
e Z .... Y | f X .... Y

14 Write down all the subsets for each of the following sets :

a {8} | b {99} | c {5 , 6}

d {3 , 5 , 9} | e The set of letters of the word "hodhod".



15 Find the number x so that each of these statements is correct :

a $\{x\} \subset \{5\}$

b $\{x, 3\} \subset \{3, 5\}$

c $\{9, 4\} \subset \{x, 5, 9\}$

d $\{0\} \subset \{2, x, 5\}$

e $\{10, 13, 12\} \subset \{x, 11, 12, 13\}$

f $\{x\} \subset \{1, 2\}$

g $\{5, x\} \subset \{3, 5, 7, 9\}$

h $\{5, 6\} \subset \{x+3, 6\}$

i $\{3, x-1\} \subset \{4, 3\}$

j $\{2\} \not\subset \{5, x\}$

k $\{1, 3, 7\} \not\subset \{1, 3, x\}$

l $\{x\} \not\subset \{5, 6\}$

m $\{2x, 7\} = \{7, 6\}$

Challenge

16 If $\{x, x-1\} \subset \{5, 6\}$, then find the value of x

17 If $\{5, x\} \subset \{4, 7, y\}$, then find the value of x and y

18 If $\{3, x\} \subset \{3, 4, 5\}$ and $\{x, 7, 1\} \subset \{1, 5, 6, 7\}$, then find x



Test on the first part of unit two



Answer the following questions :

1 Choose the correct answer from the given ones :

1. $\{2, 4\}$ .... $\{2, 3, 4\}$ ($\in$ or $\notin$ or $\subset$ or $\not\subset$)
2. The set of odd numbers is .... set. (a finite or an infinite or an empty)
3. 12 .... $\{0, 2, 4, 6, 8, \cdots\}$ ($\in$ or $\notin$ or $\subset$ or $\not\subset$)
4. $\varnothing$ .... $\{6, 7\}$ ($\in$ or $\notin$ or $\subset$ or $\not\subset$)
5. If $\{3, 4\} = \{y + 1, 4\}$, then y = ... (7 or 4 or 2 or 5)
6. 7 .... the set of the days of the week. ($\in$ or $\notin$ or $\subset$ or $\not\subset$)
7. The Arabic countries is a set. (✓ or ✗)
8. The set of digits of the numbers 1996 is .... ($\{1, 6, 9\}$ or $\{1, 9, 9, 6\}$ or $\{1, 6\}$ or $\{6, 9\}$)
9. If $X = \{2, 5, 7\}$, then 27 .... X ($\in$ or $\notin$ or $\subset$ or $\not\subset$)
10. $\{1, 2, 3, 5, 13\}$.............. the set of prime numbers. ($\in$ or $\notin$ or $\subset$ or $\not\subset$)
11. If $8 \in \{5, 7, 2x\}$, then x = ... (8 or 6 or 4 or 2)
12. If $\{5, 4\} \subset \{7, 4, 6, m - 1\}$, then m = ... (5 or 4 or 6 or 7)
13. $\{m\}$ .... the set of letters of the word "Bassem" ($\in$ or $\notin$ or $\subset$ or $\not\subset$)
14. If $3 \notin \{x, x - 1, x + 1\}$, then x = ... (2 or 3 or 4 or 1)



2 Complete the following :

15 If $6 \notin \{3, 4, x-2\}$, then $x \neq$ ....

16 If $\{5, a, 8\} = \{b, 8, 9\}$, then a = ... , b = ...

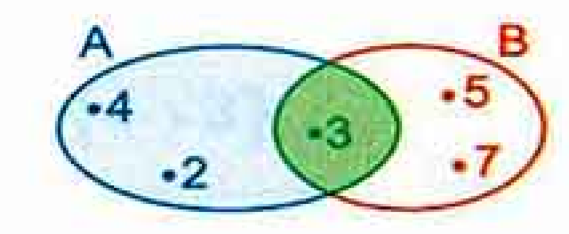
17 The number of elements of the null set is ....

18 The set of even numbers smaller than 9 is ....

19 **In the opposite figure :**

A = ...

, B = ...



20 The .... is a subset of any set.

21 The elements of the set of the main directions are ....

22 The number of the subsets of $A = \{a, b\}$ is ....

3 Answer the following :

23 Represent each of the following sets by a Venn diagram :

[a] $M = \{5, 6, 9\}$

[b] $R = \{m, a, t, h\}$

24 Write all the elements of each of the following stes :

[a] The set of letters of the word "letter".

[b] The set of odd numbers less than 8

....

....

25 Write all the subsets of $Y = \{1, 2, 3\}$

....

26 Express each of the following sets by using the listing method :

[a] A = the set of factors of the number 20

[b] B = the sets of the colours in the Egyptian flag.

....

....





5 Lesson Intersection of two sets

The intersection of the two sets is the set of all common elements in the two sets. It is denoted by the symbol "∩"

i.e. "$X \cap Y$" means "The set of all elements of X which are also elements of Y"

- For any two sets, there are **four possibilities of the intersection** of these two sets, as shown in the following examples :

1. The two sets have **one common element or more :**
   If $X = \{1, 2, 5\}$ and $Y = \{5, 1, 3\}$, then $X \cap Y = \{1, 5\}$

2. The two sets have **no common elements :**
   If $A = \{1, 2, 3\}$ and $B = \{5, 6\}$, then $A \cap B = \varnothing$

3. The two sets are **not equal and one of them is a subset of the other :**
   If $M = \{1, 3\}$ and $N = \{4, 1, 2, 3\}$, then $M \cap N = \{1, 3\} = M$

4. The two sets are **equal :**
   If $S = \{a, b, c\}$ and $P = \{c, b, a\}$, then $S \cap P = \{a, b, c\} = S = P$



Summary

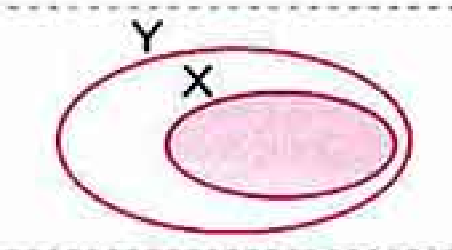
From the previous cases , we get :

- **If** X and Y are intersected — **Then** $X \cap Y$ = the elements in the shaded part

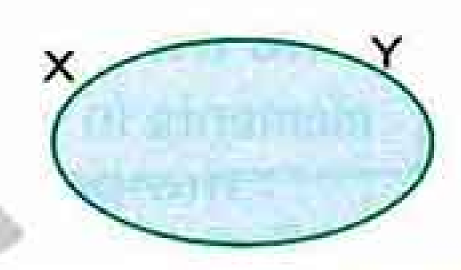


- **If** X and Y are disjoint — **Then** $X \cap Y = \varnothing$

- **If** $X \subset Y$ "containment" — **Then** $X \cap Y = X$



- **If** $X = Y$ "equality" — **Then** $X \cap Y = X = Y$



Example (1)

By using the following figures , find $X \cap Y$:

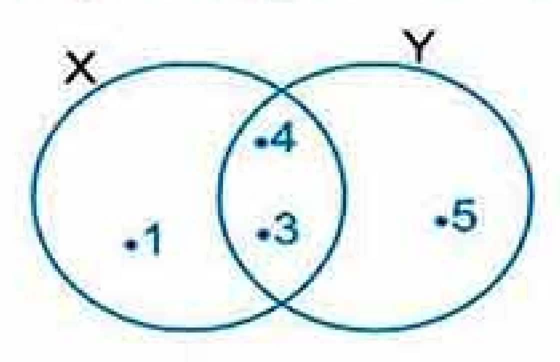


Fig. (1)

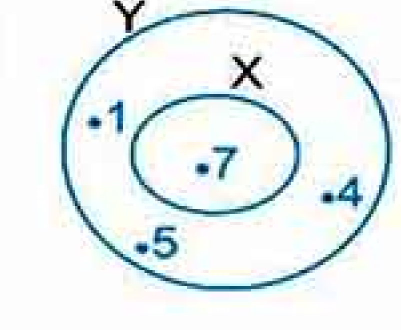


Fig. (2)

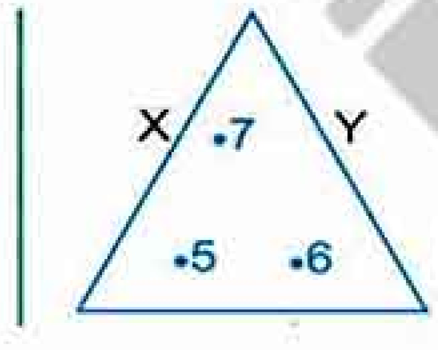


Fig. (3)

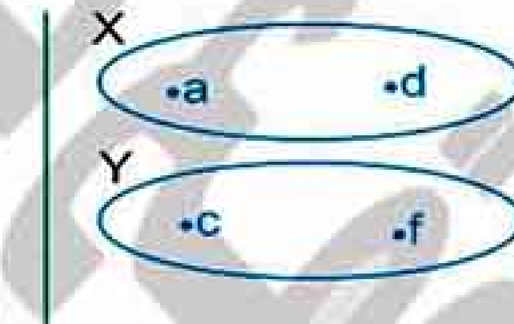


Fig. (4)

Solution

Fig. (1) : $X \cap Y = \{3 , 4\}$

Fig. (2) : $X \cap Y = \{7\}$

Fig. (3) : $X \cap Y = \{5 , 6 , 7\}$

Fig. (4) : $X \cap Y = \varnothing$



Example 2

Find each of the following :

[a] {2 , 3 , 4} ∩ {5 , 4 , 2}

[b] {5 , 7 , 8} ∩ {4 , 2 , 1}

[c] {4 , 6} ∩ {6 , 4}

[d] {3} ∩ {33}

[e] {a , b} ∩ {c , d , a , b}

[f] {1 , 2 , 3} ∩ the set of digits of the number 2051

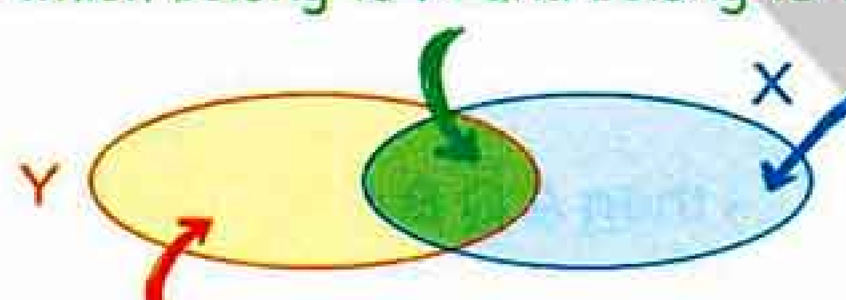
Solution

[a] {2 , 4} | [b] ∅ | [c] {4 , 6}

[d] ∅ | [e] {a , b} | [f] {1 , 2}

How can you represent two sets having some common elements ?

1. Write the common elements in this area "The elements which belong to X and belong to Y"

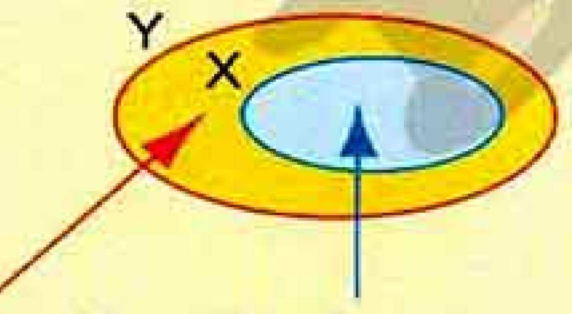


3. Complete the elements of the set X "The elements which belong to X and do not belong to Y"

2. Complete the elements of the set Y "The elements which belong to Y and do not belong to X"

Remark

If all elements of the set X **belong to** the set Y, then we can represent the two sets as the opposite Venn diagram.



The elements which belong to Y and do not belong to X

The elements of the set X





Example 3

Represent the two sets A and B by a Venn diagram in each of the following cases , then find A ∩ B :

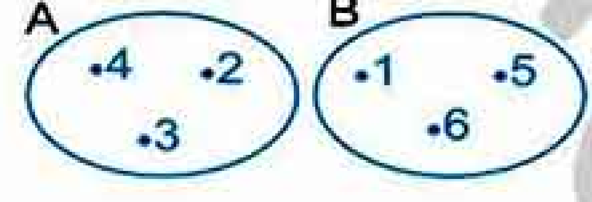
[a] A = {4 , 2 , 3} , B = {1 , 5 , 6}

[b] A = {7 , 6 , 5 , 8} , B = {8 , 7 , 9}

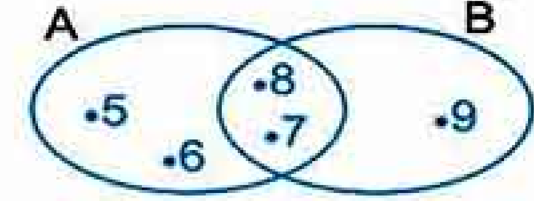
[c] A = {1 , 2} , B = {1 , 2 , 3 , 4}

[d] A = {e , y} , B = the set of letters of the word "eye".

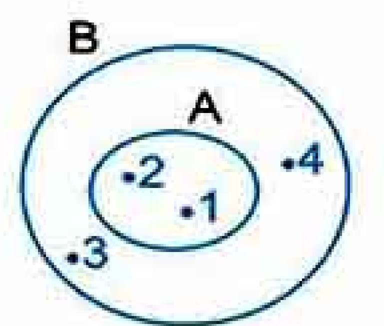
Solution

[a] 

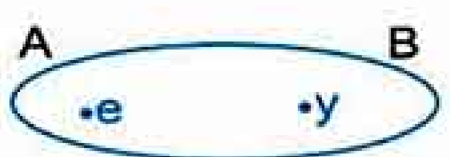
, then A ∩ B = ∅

[b] 

, then A ∩ B = {7 , 8}

[c] 

, then A ∩ B = {1 , 2}

[d] 

, then A ∩ B = {e , y}





Properties of intersection

The following example shows the properties of intersection :

Example (4)

If A = {2 , 4 , 5} , B = {4 , 3 , 5} and C = {6 , 7 , 5 , 3 , 1} , then find :

[a] $A \cap B$ and $B \cap A$, and what do you notice ?

[b] $(A \cap B) \cap C$ and $A \cap (B \cap C)$, and what do you notice ?

Solution

[a] $A \cap B = \{4 , 5\}$ and $B \cap A = \{4 , 5\}$, then $A \cap B = B \cap A$

i.e. *Intersection of sets is commutative.*

[b] $(A \cap B) \cap C = \{4 , 5\} \cap \{6 , 7 , 5 , 3 , 1\} = \{5\}$

and $A \cap (B \cap C) = \{2 , 4 , 5\} \cap \{3 , 5\} = \{5\}$,

then $(A \cap B) \cap C = A \cap (B \cap C)$

i.e. *Intersection of sets is associative.*

Remarks

If **A** and **B** are two non-empty sets , then :

1. $\varnothing \cap A = A \cap \varnothing = \varnothing$
2. If A = B , therefore $A \cap B = A = B$
3. If $A \subset B$, therefore $A \cap B = A$



- **Complete each of the following :**

[a] $\{2 , 5 , 7\} \cap \{5 , 9 , 7\}$ = ...

[b] $\{0 , 1\} \cap \{7 , 3 , 10 , 20\}$ = ...

[c] $\{3 , 2 , 5\} \cap \varnothing$ = ...

[d] If $X \subset Y$, then $X \cap Y$ = ...



Exercise 15

Intersection of two sets

From the school book

1 By using the following figures , find X ∩ Y :



Fig. (1)

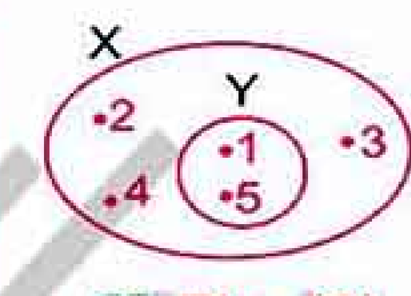


Fig. (2)

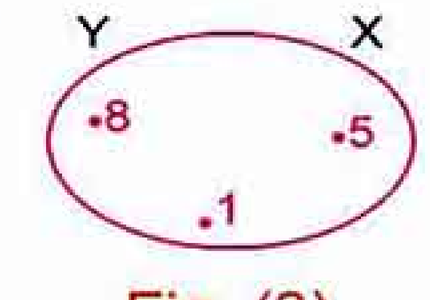


Fig. (3)

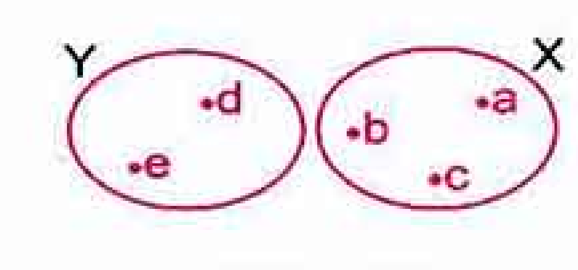
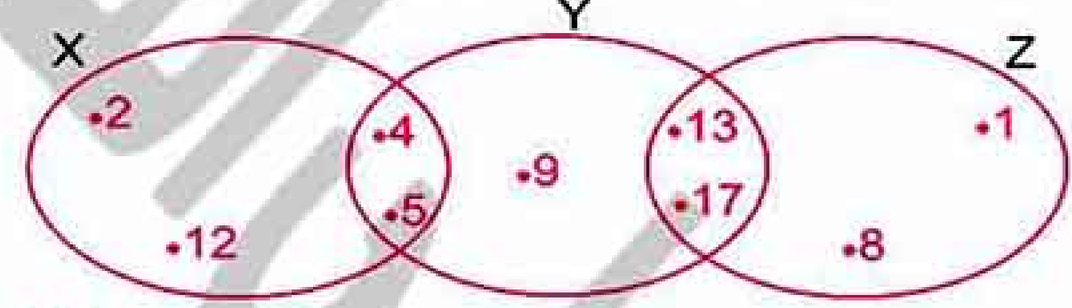


Fig. (4)

2 The Venn diagram below shows sets X , Y and Z :

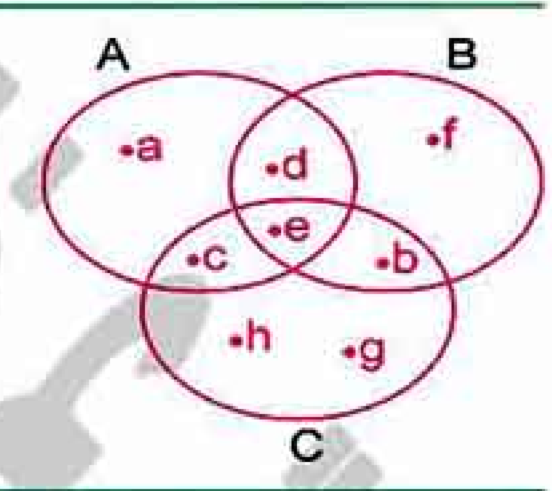


List the elements of :

a X ∩ Y   b X ∩ Z   c Y ∩ Z   d X ∩ Y ∩ Z

3 The opposite Venn diagram shows sets A , B and C

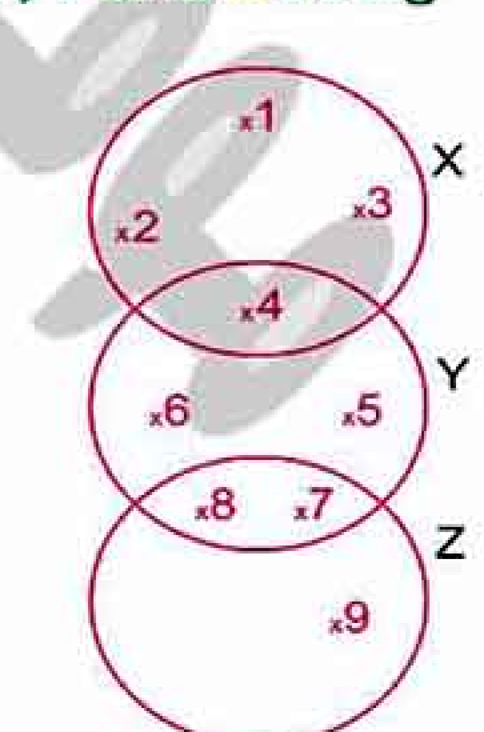
List the elements of :



a A ∩ B   b B ∩ C

c C ∩ A   d A ∩ B ∩ C

4 Look at the opposite Venn diagram and write down X , Y and Z using the listing method , then find the following :



a X ∩ Y = ...

b X ∩ Z = ...

c Y ∩ Z = ...

d {5 , 6 , 7 , 8} ∩ Z = ...

e {3 , 2} ∩ X = ...

f {2 , 5 , 8} ∩ Y = ...



5 Find each of the following :

a 📖 $\{5, 6\} \cap \{4, 5\}$
b $\{2, 3, 4\} \cap \{3, 5, 2, 6\}$
c $\{5, 3\} \cap \{2, 4, 5\}$
d 📖 $\{1, 2, 9\} \cap \{1, 2, 4, 9\}$
e $\{a, b, c\} \cap \{d, h, f\}$
f $\{2\} \cap \{3, 2, 6\}$
g $\{3, 6\} \cap \{6, 3\}$
h $\{2\} \cap \{22\}$
i 📖 $\{1, 7, 14\} \cap \{2, 14, 1\}$
j 📖 $\{3, 2, 5\} \cap \{4, 23, 55\}$
k $\{\ \} \cap \{0\}$
l $\{35\} \cap \{53\}$
m $\{3, 4\} \cap \{43\}$
n $\{1, 2, 6\} \cap \{1, 62\}$
o $\varnothing \cap \{5, 6, 7\}$
p $\varnothing \cap \varnothing$

q $\{3, 4, 5, 6\} \cap$ the set of digits of the number 63645

r The set of digits of the number 45472 $\cap$ the set of digits of the number 11308

s The set of odd numbers $\cap$ the set of whole numbers between 0 and 6

t The set of digits of the number 444 $\cap$ the set of digits of the number 44

6 Represent the two sets A and B by a Venn diagram , then find $A \cap B$:

a $A = \{4, 6, 8\}$, $B = \{3, 5, 7\}$

b $A = \{c, d, e, f\}$, $B = \{d, e, l\}$

c $A = \{1, 2, 3, 4\}$, $B = \{2, 3\}$

d $A = \{l, u\}$, B = {the set of letters of the word "Laila"}

7 If $A = \{1, 3, 5, 7\}$, $B = \{3, 7, 9, 11\}$ and $C = \{1, 2, 5, 11\}$, list the sets :

a $A \cap B$ b $B \cap C$ c $C \cap A$

8 If $A = \{x, y, z, l\}$, $B = \{x, z, m, n\}$ and $C = \{y, m, n\}$, list the sets :

a $A \cap B$ b $B \cap C$ c $C \cap A$



9 If X = the set of prime numbers less than 12 , Y = the even numbers less than 12 and Z = the whole numbers , list each of the two sets :

a $X \cap Y$ b $Y \cap Z$

10 Let X = {2 , 3 , 5 , 6 , 7} , Y = {0 , 3 , 5 , 4} and Z = {2 , 5 , 0 , 8 , 9}
List each of these sets :

a $X \cap Y$ b $Z \cap X$ c $Y \cap Z$ d $X \cap Y \cap Z$

then represent the three sets X , Y and Z by a Venn diagram.

11 If X = {1 , 2 , 3} , Y = {2 , 3 , 5 , 6} and Z = {1 , 2 , 5}
Represent each of X , Y and Z using a Venn diagram, then find the following :

a $(X \cap Y) \cap Z$ b $X \cap (Y \cap Z)$

What do you observe ?

12 In each of the following figures , shade (if possible) the part which represents $X \cap Y$:

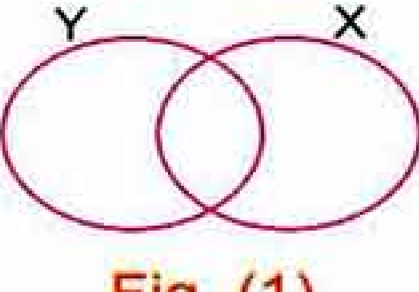


Fig. (1)



Fig. (2)

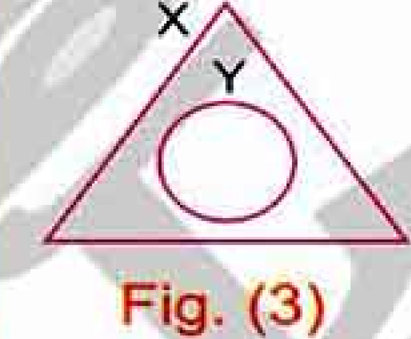


Fig. (3)

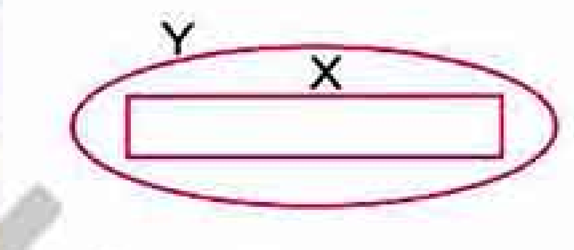


Fig. (4)

13 In each of the following figures , shade (if possible) the part which represents $X \cap Y \cap Z$:

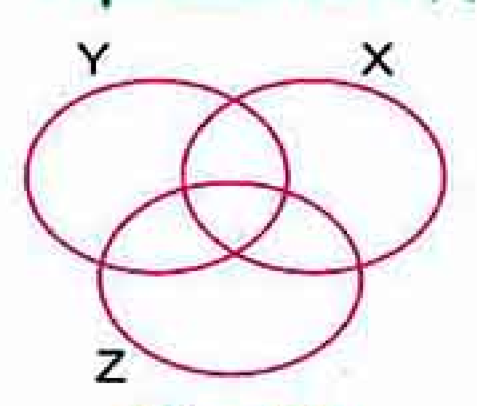


Fig. (1)

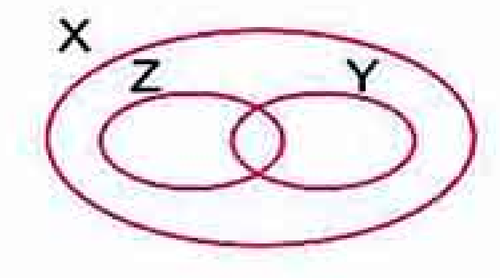


Fig. (2)

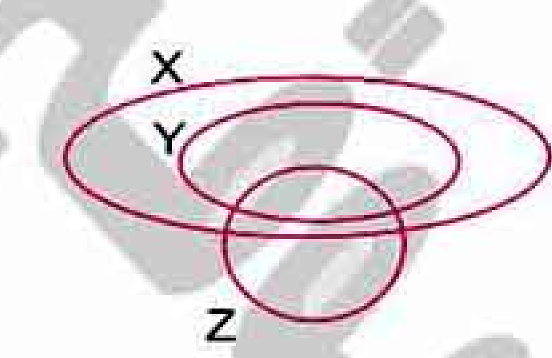


Fig. (3)

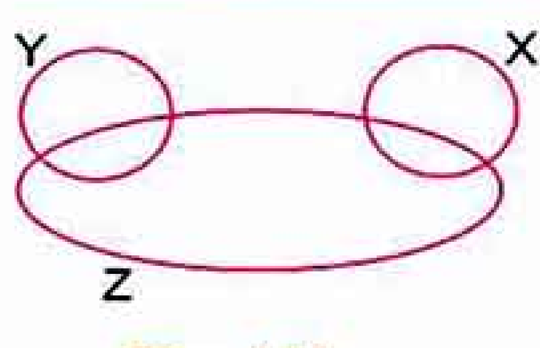


Fig. (4)

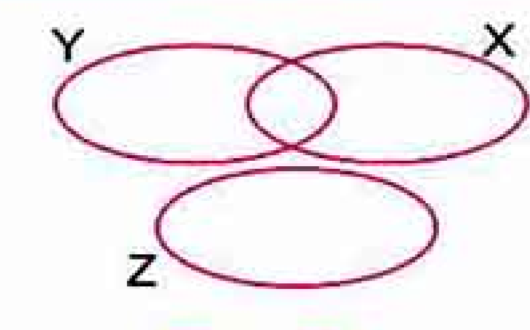


Fig. (5)

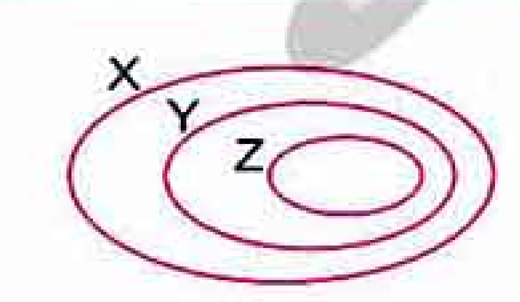
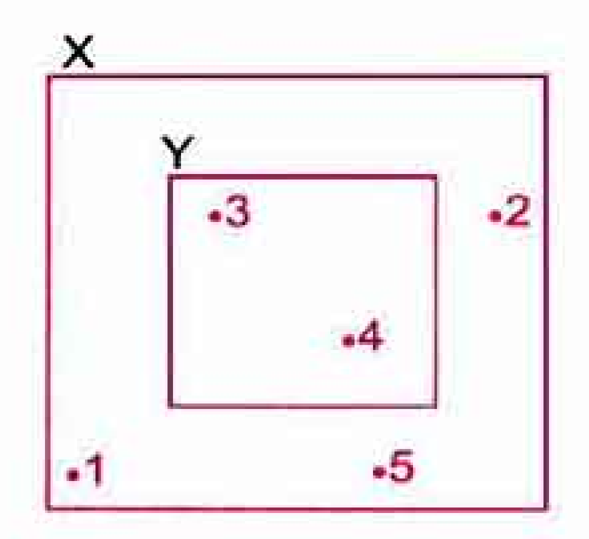


Fig. (6)



14 The opposite Venn diagram shows sets X and Y

Put the suitable sign ($\in$, $\notin$, $\subset$ or $\not\subset$) :



a 3 .... (X ∩ Y)

b {1 , 2 , 5} .... (X ∩ Y)

c {3} .... (X ∩ Y)

d {3 , 4} .... (X ∩ Y)

15 Complete the following using ($\in$, $\notin$, $\subset$ or $\not\subset$) :

a 3 .... {3 , 4 , 5} ∩ {2 , 3 , 4}

b {3 , 4} .... {3 , 4 , 7} ∩ {5 , 4 , 3}

c {2} .... {5 , 2 , 3} ∩ {1 , 2 , 5}

d {6} .... {5} ∩ {6}

e 15 .... {5} ∩ {1}

f {13} .... {13} ∩ {3}

g 2 .... {2 , 3} ∩ {3 , 4}

h {36} .... {6 , 16 , 36} ∩ {6 , 36}

i 8 .... { } ∩ {8}

j {2 , 5 , 6} ∩ {3 , 5} .... {2 , 5}

k {5 , 6 , 1} ∩ {5 , 16} .... {5}

l {2 , 3} ∩ {32} .... {2 , 3 , 32}

16 Place the suitable symbol ($\in$, $\notin$, $\subset$ or $\not\subset$) to make each of the following sentences true :

a If X = {1 , 2 , 3} ∩ {2 , 4 , 6} , then 3 X

b If Y = {2 , 3 , 5} ∩ {1 , 3 , 5} , then {1 , 2 , 3 , 5} .... Y

c If Z = {3 , 4 , 5} ∩ {2 , 3 , 4} , then 4 .... Z

d If R = {2 , 5 , 6} ∩ {3 , 5} , then R .... {2 , 5}

e If M = {5 , 2 , 3} ∩ {1 , 5} , then M .... {2}



17 Complete :

a. If $a \in X \cap Y$, then $a \in$ .... and $a \in$ ....

b. If $X \subset Y$, then $X \cap Y =$ ....

c. If $X \cap Y = Y$, then .... $\subset$ ....

d. If $X \cap Y = \varnothing$, then X and Y are two .... sets.

e. $X \cap$ .... $= Y \cap$ ....

f. $X \cap \varnothing =$ ....

g. $X \cap X =$ ....

18 Choose the correct answer :

a. If $x \in \{2 , 5\} \cap \{5 , 7 , 8\}$, then $x =$ .... (2 or 5 or 7 or 8)

b. If $\{4 , 3\} \cap \{x , 1 , 2\} = \{3\}$, then $x =$ .... (1 or 2 or 3 or 4)

c. If $\{2\} \cap \{x\} = \{2\}$, then $x =$ .... (22 or 2 or zero or $\varnothing$)

d. If $\{15 , x\} \cap \{5 , 1\} = \{5\}$, then $x =$ .... (15 or 5 or 1 or zero)

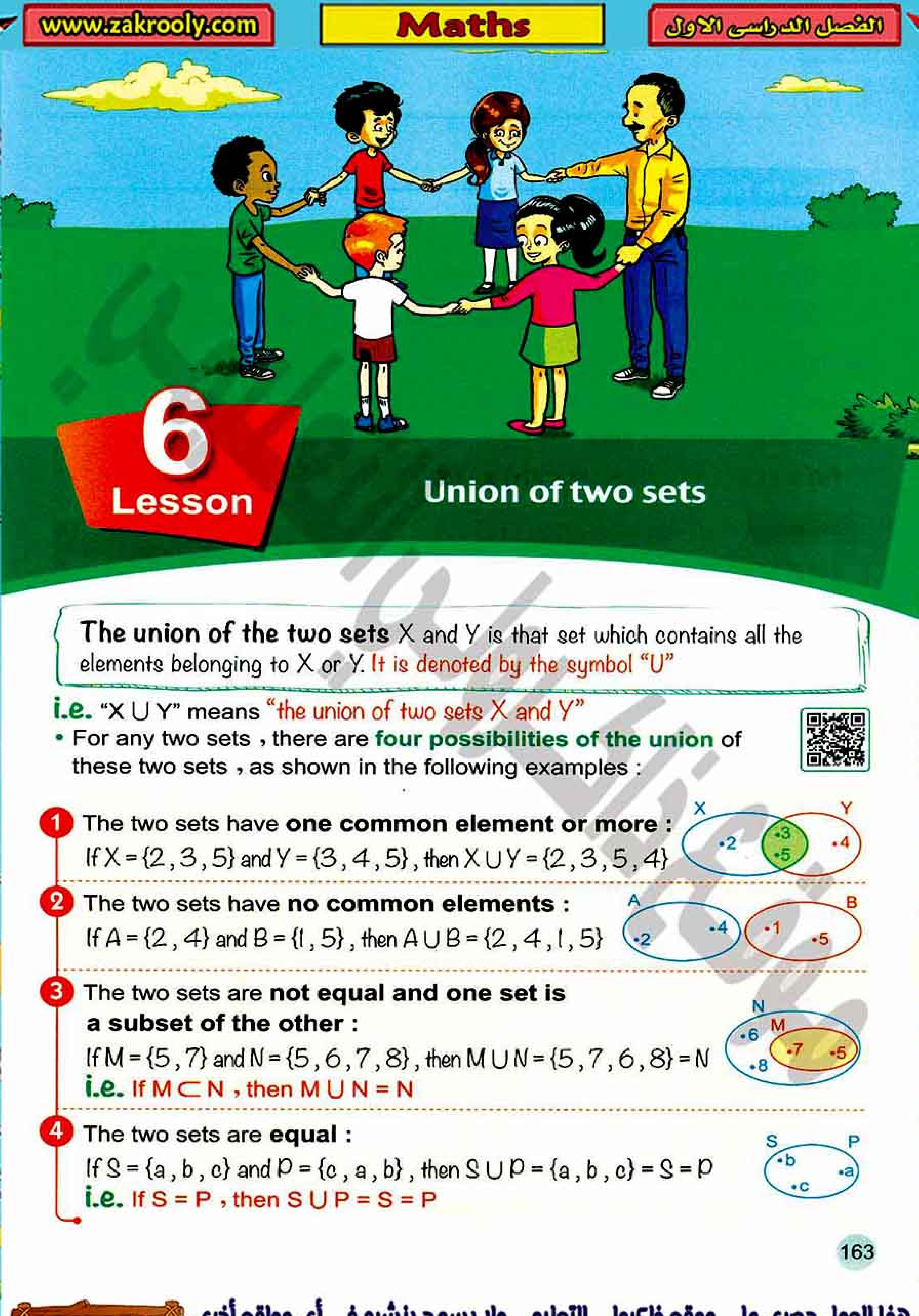
e. If $\{5 , 3\} \cap \{3 , 9\} = \{x\}$, then $x =$ .... (9 or 35 or 5 or 3)

f. If $\{1 , 5 , 6\} \cap \{5 , x , 3\} = \{5 , 6\}$, then $x =$ .... (1 or 3 or 5 or 6)

g. If $\{1 , 2\} \cap \{x + 1 , 3\} = \{2\}$, then $x =$ .... (0 or 1 or 2 or 3)

Challenge

19 If $X \cap Y = \{3 , 5\}$, $X \subset$ the set of factors of 15 , $Y \subset$ the set of factors of 15 , $15 \in X$ and Y has 3 elements.
Represent X and Y by a Venn diagram.



6 Lesson — Union of two sets

The union of the two sets X and Y is that set which contains all the elements belonging to X or Y. It is denoted by the symbol "U"

i.e. "X ∪ Y" means "the union of two sets X and Y"

- For any two sets, there are **four possibilities of the union** of these two sets, as shown in the following examples :

1 The two sets have **one common element or more :**

If X = {2, 3, 5} and Y = {3, 4, 5}, then X ∪ Y = {2, 3, 5, 4}

2 The two sets have **no common elements :**

If A = {2, 4} and B = {1, 5}, then A ∪ B = {2, 4, 1, 5}

3 The two sets are **not equal and one set is a subset of the other :**

If M = {5, 7} and N = {5, 6, 7, 8}, then M ∪ N = {5, 7, 6, 8} = N

i.e. If M ⊂ N, then M ∪ N = N

4 The two sets are **equal :**

If S = {a, b, c} and P = {c, a, b}, then S ∪ P = {a, b, c} = S = P

i.e. If S = P, then S ∪ P = S = P

Lesson 6

How to find X ∪ Y ?

1. **Write** the elements of the set X
2. **Complete** writing the rest of the elements of the set Y (if we find it) without repetition.

Example 1

Let X = {2 , 3 , 5 , 8} , Y = {0 , 3 , 4 , 5} and Z = {1 , 2 , 3 , 7}

List the following sets :

[a] X ∪ Y [b] X ∪ Z [c] Y ∪ Z

Solution

[a] X ∪ Y = {2 , 3 , 5 , 8 , 0 , 4}

[b] X ∪ Z = {2 , 3 , 5 , 8 , 1 , 7}

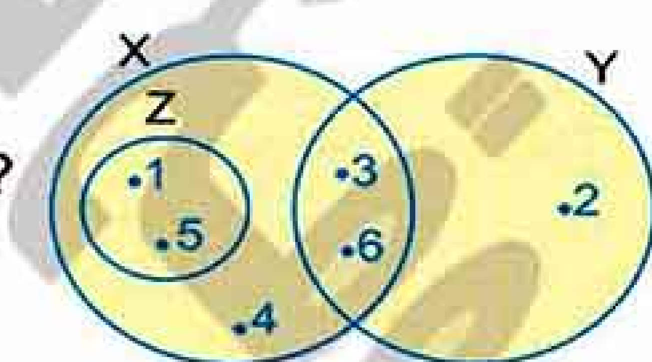
[c] Y ∪ Z = {0 , 3 , 4 , 5 , 1 , 2 , 7}

Properties of union

The following example shows the properties of union :

Example 2

Use the opposite Venn diagram to find :



[a] X ∪ Y , Y ∪ X and what do you notice?

[b] (X ∪ Y) ∪ Z , X ∪ (Y ∪ Z) and what do you notice ?

[c] (X ∪ Y) ∩ Z , X ∪ (Y ∩ Z)

Is (X ∪ Y) ∩ Z = X ∪ (Y ∩ Z) ?

Solution

[a] X ∪ Y = {1 , 2 , 3 , 4 , 5 , 6} ,

Y ∪ X = {1 , 2 , 3 , 4 , 5 , 6} ,

then X ∪ Y = Y ∪ X

i.e. *Union of sets is commutative.*





[b] $(X \cup Y) \cup Z = \{1, 2, 3, 4, 5, 6\} \cup \{1, 5\} = \{1, 2, 3, 4, 5, 6\}$,
$X \cup (Y \cup Z) = \{1, 5, 3, 6, 4\} \cup \{1, 5, 3, 2, 6\} = \{1, 2, 3, 4, 5, 6\}$,
then $(X \cup Y) \cup Z = X \cup (Y \cup Z)$

i.e. ***Union of sets is associative.***

[c] $(X \cup Y) \cap Z = \{1, 2, 3, 4, 5, 6\} \cap \{1, 5\} = \{1, 5\}$,
$X \cup (Y \cap Z) = \{1, 3, 4, 5, 6\} \cup \varnothing = \{1, 3, 4, 5, 6\}$,
then $(X \cup Y) \cap Z \neq X \cup (Y \cap Z)$

Remarks

If **A** and **B** are two non-empty sets, then :

1. $\varnothing \cup A = A$
2. If $A = B$, therefore $A \cup B = A = B$
3. If $A \subset B$, therefore $A \cup B = B$



- **Complete the following :**

[a] $\{3, 4\} \cup \{3, 5, 7\} =$ ....

[b] $\{7, 9, 3\} \cup \{7, 9\} =$ ....

[c] If $X \subset Y$, then $X \cup Y =$ ....

[d] If $A \cup B = A$, then .... $\subset$ ....

[e] $\varnothing \cup X =$ ....



Exercise 16

Union of two sets

From the school book

1 Using the following figures, find X ∪ Y :

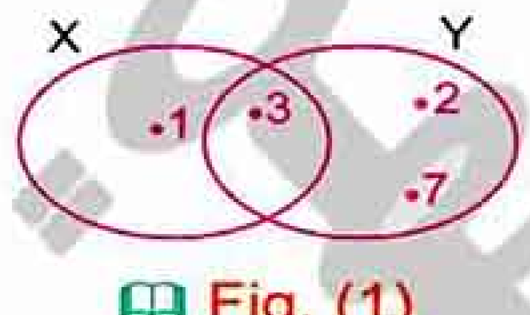



Fig. (1)

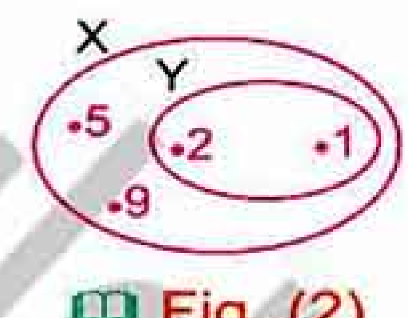


Fig. (2)

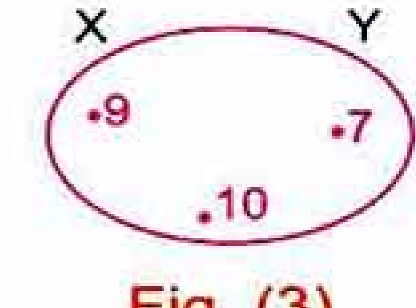


Fig. (3)

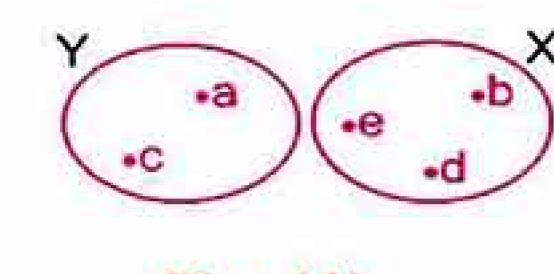


Fig. (4)

2 Find each of the following :

a {2} ∪ {4}

b {1 , 5} ∪ {1 , 3}

c {1 , 2 , 12} ∪ {2 , 3 , 12}

d {a , b , c} ∪ {a , b , h}

e {5} ∪ {1 , 5 , 7}

f {2 , 4} ∪ {4 , 2}

g {3} ∪ {3}

h {5} ∪ {55}

i {0} ∪ {20}

j {15} ∪ {51}

k {5 , 3} ∪ {35}

l {5 , 4 , 1} ∪ {45 , 1}

m ∅ ∪ {2 , 4}

n {1 , 4 , 6} ∪ ∅

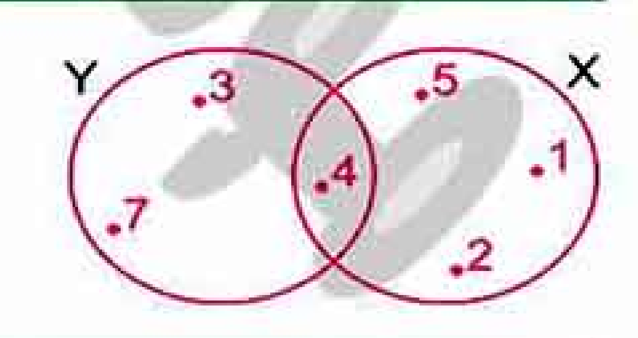
o {3 , 4 , 5 , 6} ∪ the set of digits in the number 25753

p The set of letters of the word "book" ∪ the set of letters of the word "boom".

3 Look at the opposite Venn diagram , then find :

X ∪ Y and Y ∪ X

What do you observe ?



4 Given that : X = {1 , 2 , 3} , Y = {2 , 3 , 5 , 6} and Z = {1 , 2 , 5}

Find each of : (X ∪ Y) ∪ Z and X ∪ (Y ∪ Z)

What do you observe ?



5 Represent the two sets A and B in each of the following by a Venn diagram , then find A ∪ B :

a A = {1 , 2} , B = {6 , 7 , 8}

b A = {5 , 12 , 15} , B = {11 , 12}

c A = {1 , 2 , 3 , 4} , B = the set of digits in the number 1313

6 Let X = {2 , 3 , 5} , Y = {5 , 6} and Z = {3} , find the following sets :

a X ∪ Y b X ∪ Z c Z ∪ Y d X ∪ Y ∪ Z

Then represent the three sets X , Y and Z by a Venn diagram.

7 In each of the following , shade the part representing X ∪ Y :

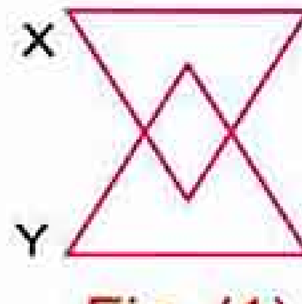


Fig. (1)

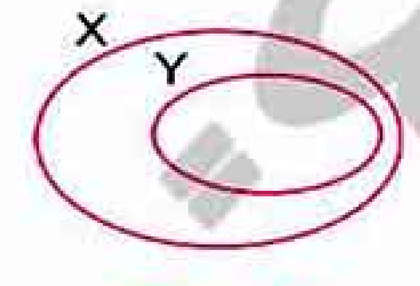


Fig. (2)

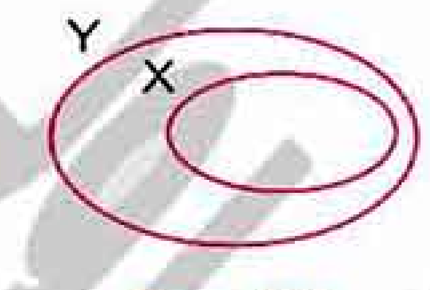


Fig. (3)

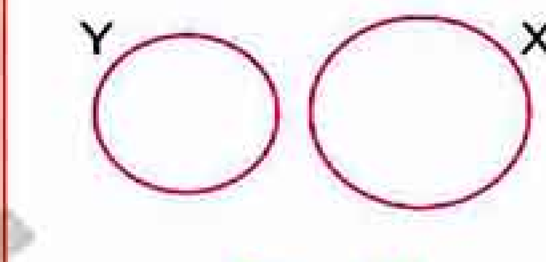


Fig. (4)

8 By using the opposite Venn diagram , find :

a X ∪ Y b X ∩ Y c X ∪ Z

d X ∩ Z e Y ∪ Z f Y ∩ Z

g X ∪ Y ∪ Z h X ∩ Y ∩ Z i {2 , 5} ∪ Z

9 Let X = {3 , 4 , 5} and Y = {2 , 3 , 4}

Complete the following by using the suitable symbol from " ∈ , ∉ , ⊂ or ⊄ " :

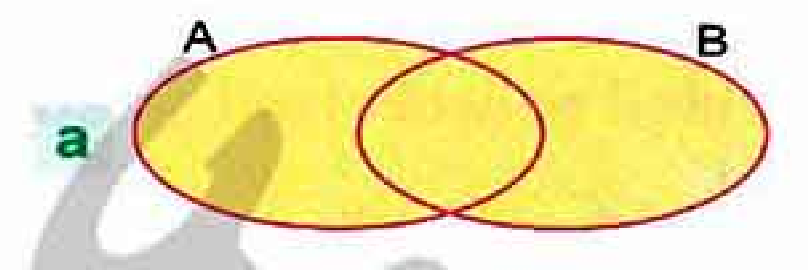
a {3 , 4} .... X ∪ Y b 5 .... X ∩ Y

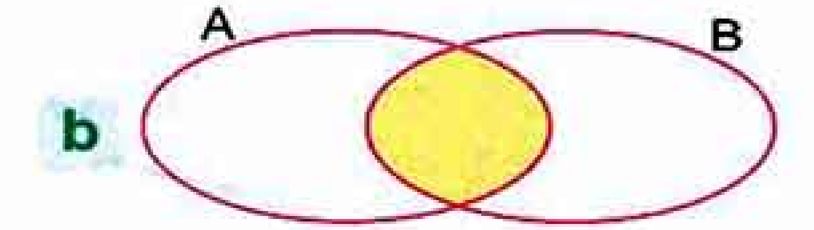
c 33 .... X ∪ Y d {3 , 4 , 5} .... X ∪ Y

e {20 , 3 , 5} .... X ∪ Y f 2 .... X ∪ Y

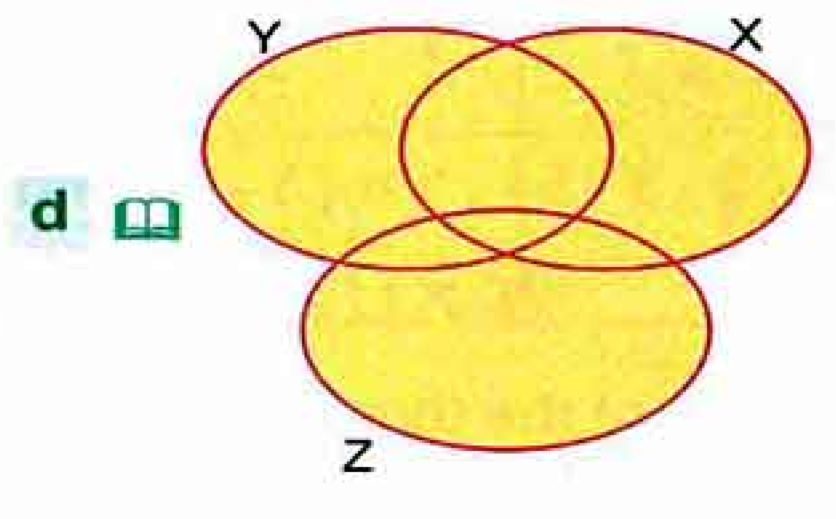
g { } .... X ∪ Y h X ∩ Y .... X ∪ Y

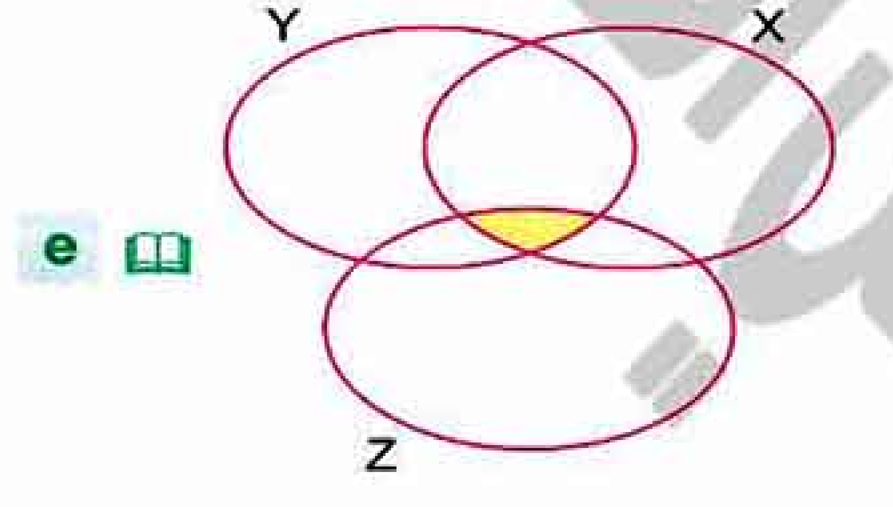
10 In each of the following Venn diagrams, write what the coloured section represents :

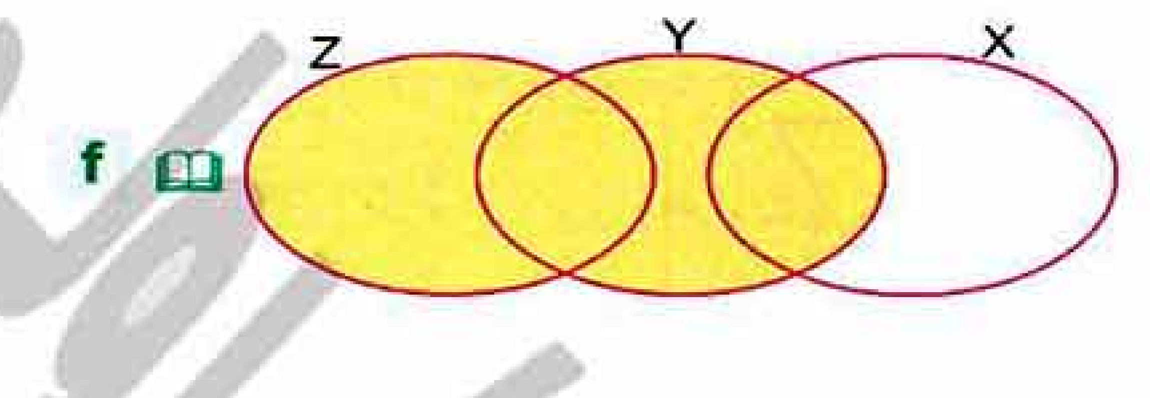
a


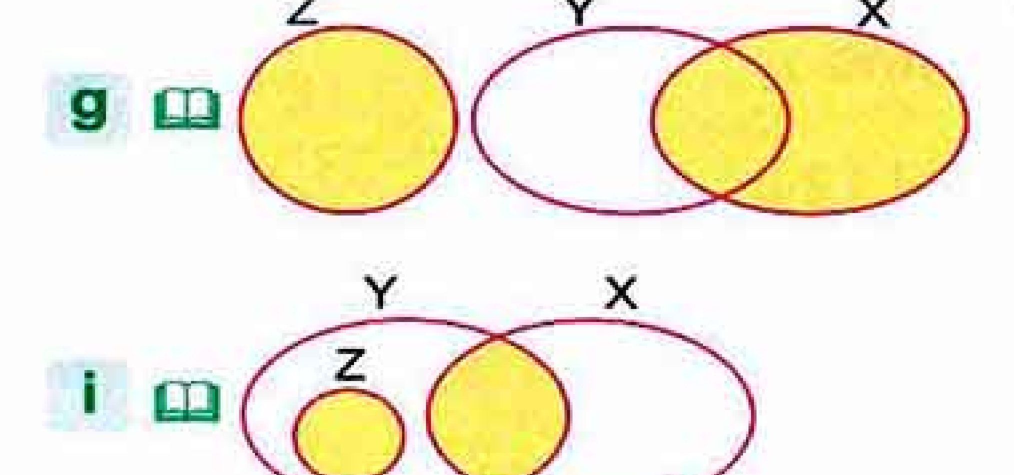
b


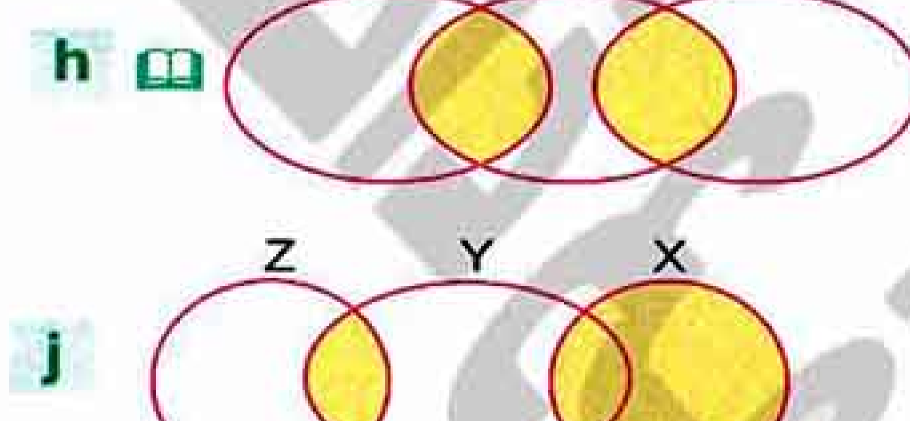
c


d


e


f


g, i


h, j


11 Complete each of the following :

a If $a \in X$ or $a \in Y$, then $a \in$ ....

b If $a \in X$ and $a \in Y$, then $a \in$ ....

c If $X \subset Y$, then $X \cap Y =$ .... and $X \cup Y =$ ....

d If $X \cup Y = Y$, then ....

e If $X \cap Y = Y$, then ....

f If $X \cap Y = \varnothing$, then two sets X and Y are ....

g If $X \cup Y = \varnothing$, then the two sets X and Y are ....

h If $X \cap Y = Y \cup X$, then the two sets X and Y are ....

i $X \cap$ .... $= Y \cap$ .... and $X \cup$ .... $= Y \cup$ ....

j $X \cap \varnothing =$ .... and $X \cup \varnothing =$ ....

k $X \cap X =$ .... and $X \cup X =$ ....

l $\varnothing \cap \varnothing =$ .... and $\varnothing \cup \varnothing =$ ....

12 In each of the following , find x such that each of the following statements is correct :

a $\{5\} \cup \{x\} = \{5 , 3\}$

b $\{2 , 3\} \cup \{2 , x\} = \{2 , 3 , 5\}$

c $\{1 , 5\} \cup \{2 , x\} = \{1 , 2 , 5 , 6\}$

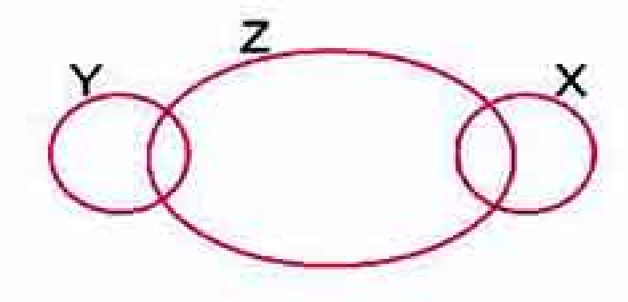
d $\{2 , 3\} \cup \{1 , 5\} = \{1 , 2 , 3 , x\}$

e $\{3 , 4\} \cup \{2 , x\} = \{2 , 3 , 4\}$

f $\{4 , 7\} \cup \{1 , 5 , x\} = \{1 , 4 , 5 , x\}$

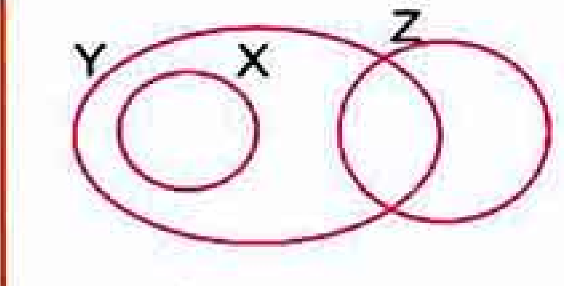
Challenge

13 In each of the following , shade the part representing the given set :



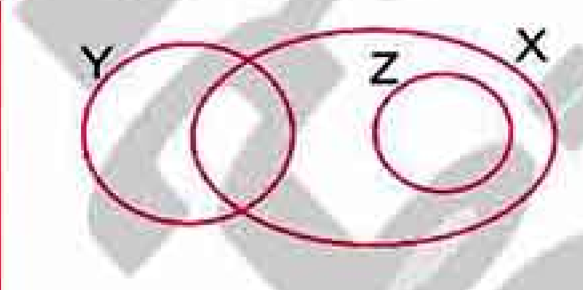
$(X \cup Y) \cap Z$

Fig. (1)



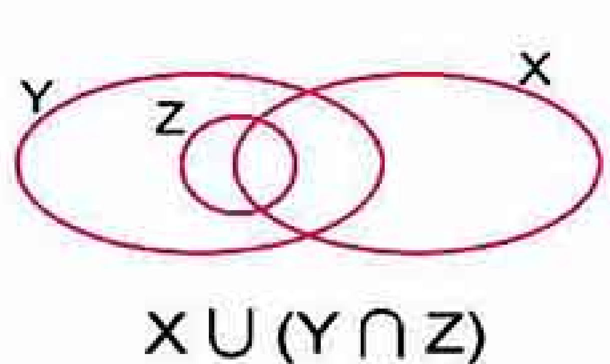
$X \cap (Y \cup Z)$

Fig. (2)



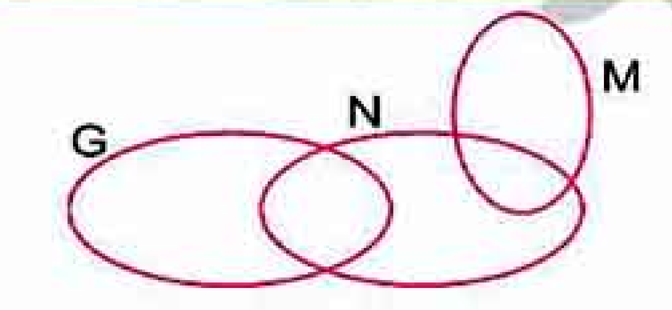
$(X \cap Y) \cup Z$

Fig. (3)



$X \cup (Y \cap Z)$

Fig. (4)



$(M \cap N) \cup (N \cap G)$

Fig. (5)

7 Lesson The universal set - The complement of a set

The universal set

The universal set is the mother set which includes all the given subsets. It is denoted by "U"

For Example :

If X = {Cairo , Tunis} , Y = {Algiers , Rabat , Khartoum}

X  Y    

Then we can find a set that contains the two sets X and Y

This set can be : The set of Arab capitals.

- **In this case :** The universal set **U** is **"The set of Arab capitals"**.
- **We can also consider other universal sets of X and Y as :**

U = the set of African capitals or **the set of World capitals**

Example 1

Write the suitable universal set for each case :

[a] X = {May , March , April} , Y = {June , October}

[b] X = {□ , ○}

[c] X = {A , F , Z} , Y = {B , E , R} , Z = {L , M , O}

[d] A = {Cameroon , Nigeria}
, B = {Morocco , South Africa , Ghana}

Solution

[a] U = the set of months of the Christian year.

[b] U = the set of geometrical figures.

[c] U = the set of letters in the English alphabet.

[d] U = the set of African countries.

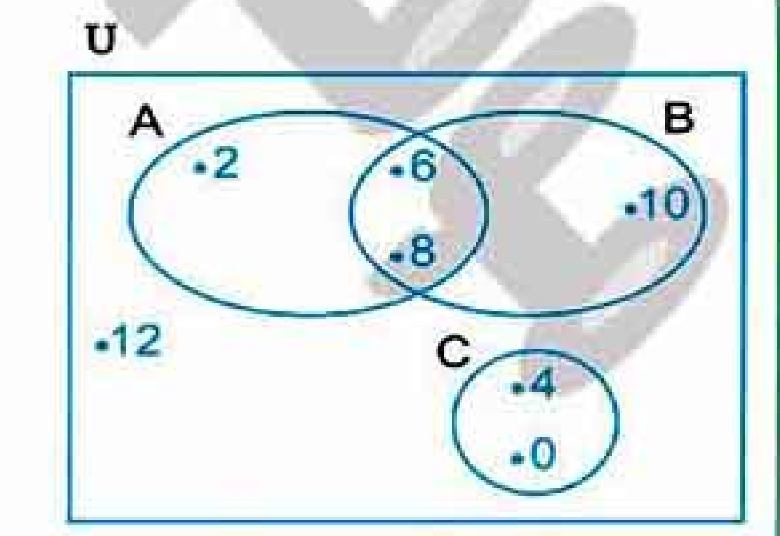
Example 2

If A = {2 , 8 , 6} , B = {10 , 8 , 6} and C = {4 , 0}

Write a suitable universal set U and represent it by Venn diagram , then find :

[a] $A \cap U$	**[b]** $B \cup U$
[c] $A \cap B$	**[d]** $C \cup B$

Solution



U = The even numbers less than 14
"You can find other universal sets"

[a] $A \cap U$ = {2 , 8 , 6} = A

[b] $B \cup U$ = {10 , 8 , 6 , 2 , 0 , 4 , 12} = U

[c] $A \cap B$ = {6 , 8}

[d] $C \cup B$ = {0 , 4 , 6 , 8 , 10}







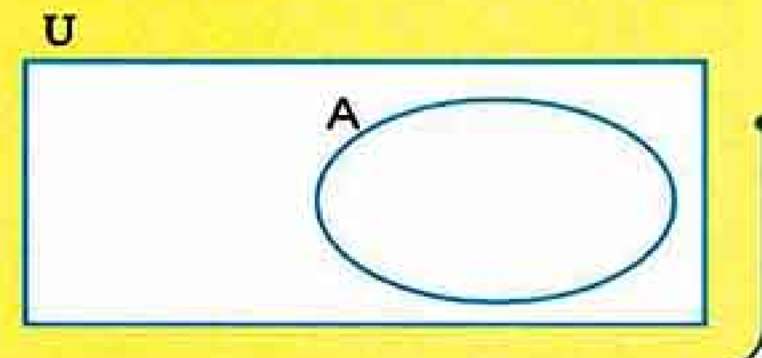
Lesson 7





Remark

From the previous example , we deduce that :
If U is the universal set and A is a subset of it , then :



1. $A \cap U = A$
2. $A \cup U = U$





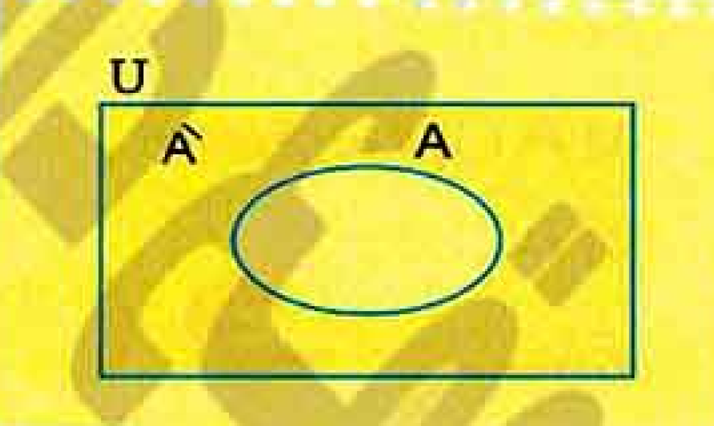
Try by yourself

- **If X = {1 , 3 , 7} and Y = {3 , 5 , 9} Write a suitable universal set U and represent it by Venn diagram.**

The complement of a set

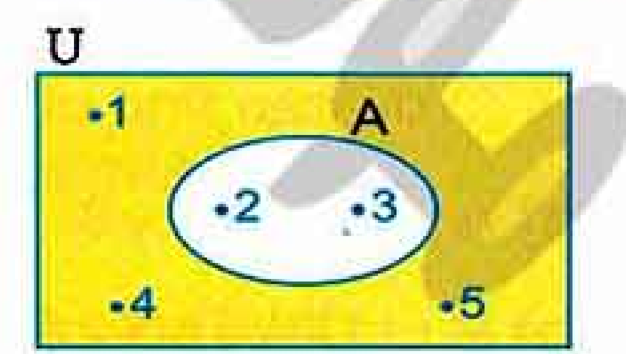
If U is the universal set and A is a subset of U , then the complement of A is the set of elements in U but not in A

The complement of A is denoted by À and can be represented by the shaded part of the opposite figure.



For Example :

If U = {1 , 2 , 3 , 4 , 5} and A = {2 , 3},
then À = {1 , 4 , 5}







Example 3

If U = {1 , 2 , 3 , 4 , 5 , 6 , 7 , 8 , 9} and A = the set of whole numbers between 4 and 9 , then represent U and A by one Venn diagram and find :

[a] $\acute{A}$ **[b]** $(\acute{A})\grave{}$ **[c]** $A \cap \acute{A}$ **[d]** $A \cup \acute{A}$

Solution

U = {1 , 2 , 3 , 4 , 5 , 6 , 7 , 8 , 9}

A = {5 , 6 , 7 , 8}

U
•1 A •9
•5 •6
•7 •8
•2 •3 •4

[a] $\acute{A}$ = the set of elements in U that are not in A
= {1 , 2 , 3 , 4 , 9}

Notice
$(\acute{A})\grave{}$ is the complement of $\acute{A}$

[b] $(\acute{A})\grave{}$ = the set of elements in U that are not in $\acute{A}$
= {5 , 6 , 7 , 8} = A

i.e. The complement of the complement of A is A itself. **i.e.** $(\acute{A})\grave{} = A$

[c] $A \cap \acute{A}$ = {5 , 6 , 7 , 8} ∩ {1 , 2 , 3 , 4 , 9} = ∅

i.e. The set A and its complement $\acute{A}$ are disjoint. **i.e.** $A \cap \acute{A} = \varnothing$

[d] $A \cup \acute{A}$ = {5 , 6 , 7 , 8} ∪ {1 , 2 , 3 , 4 , 9}
= {1 , 2 , 3 , 4 , 5 , 6 , 7 , 8 , 9} = U

i.e. The union of a set and its complement is the universal set. **i.e.** $A \cup \acute{A} = U$

Remarks

1. The complement of the universal set "U" is the empty set "∅" *i.e.* $\grave{U} = \varnothing$
2. The complement of the empty set "∅" is the universal set "U" *i.e.* $\acute{\varnothing} = U$

Example 4

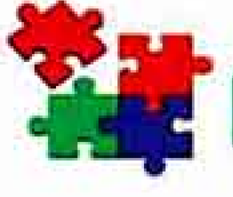
Let U = {1 , 2 , 3 , 4 , 5 , 6 , 7} , A = {1 , 3 , 4 , 7} and B = {2 , 4 , 6 , 7}
Represent the three sets by Venn diagram. Find :

[a] À | [b] B̀ | [c] À ∪ B̀
[d] À ∩ B̀ | [e] (A ∪ B)̀ | [f] (A ∩ B)̀

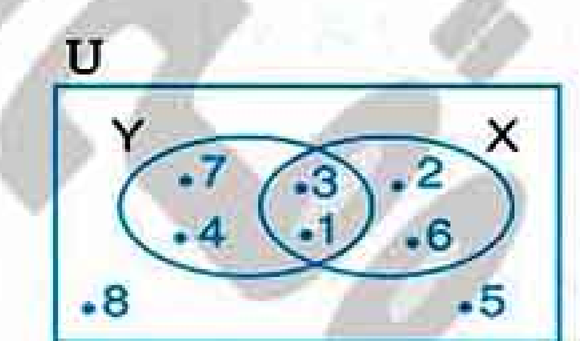
Solution

U: A {•1, •3, •4, •7}, B {•2, •6, •4, •7}, •5

[a] À = {2 , 5 , 6}
[b] B̀ = {1 , 3 , 5}
[c] À ∪ B̀ = {2 , 5 , 6} ∪ {1 , 3 , 5} = {2 , 5 , 6 , 1 , 3}
[d] À ∩ B̀ = {2 , 5 , 6} ∩ {1 , 3 , 5} = {5}
[e] A ∪ B = {1 , 3 , 4 , 7} ∪ {2 , 4 , 6 , 7} = {1 , 3 , 4 , 7 , 2 , 6}
, then (A ∪ B)̀ = {5}
[f] A ∩ B = {1 , 3 , 4 , 7} ∩ {2 , 4 , 6 , 7} = {4 , 7}
, then (A ∩ B)̀ = {1 , 2 , 3 , 5 , 6}


Try by yourself

- **Study the opposite Venn diagram , then complete :**



[a] X̀ = {..............} | [b] Ỳ = {..............}
[c] X̀ ∪ Ỳ = {..............} | [d] X̀ ∩ Ỳ = {..............}
[e] X ∪ Ỳ = {..............} | [f] X ∩ Ỳ = {..............}
[g] Y ∪ X̀ = {..............} | [h] Y ∩ X̀ = {..............}
[i] (X ∪ Y)̀ = {..............} | [j] (X ∩ Y)̀ = {..............}





Exercise 17

The universal set - The complement of a set

From the school book

1 The given sets in each of the following cases represent subsets , write a suitable universal set for each case :

a X = {0 , 6 , 8}

b X = {5 , 7 , 9 , 11 , ...}

c A = {Monday , Sunday}

d X = {Cairo , Giza , Alexandria} , Y = {Qena , Assiut}

e X = {Egypt , Libya , Sudan} , Y = {Sudan , Somalia}

f X = The set of math teachers at your school
Y = The set of science teachers at your school

g X = { , , }

h X = {Taha Hussein , Youssef Idrees , Tawfik Al-Hakeem}

2 Find the suitable universal set for each of the following sets and represent U by Venn diagram :

a X = {2 , 5 , 8} , Y = {2 , 3 , 7 , 8}

b X = {1 , 3 , 7} , Y = {5 , 7 , 9}

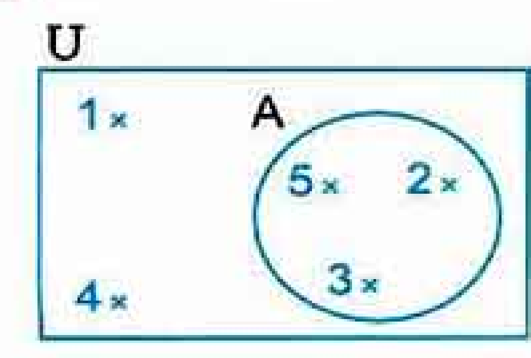
c X = {11 , 55 , 99} , Y = {44 , 33}

d X = {1 , 2} , Y = {1 , 2 , 3 , 4} , Z = {3 , 4 , 5 , 6}

e X = {3 , 4 , 5} , Y = {5 , 4 , 7} , Z = {5 , 7 , 8}

f X = the set of letters of word "MINA".
Y = the set of letters of word "BASSEM".
Z = the set of letters of word "SARAH".

3 Look at the opposite Venn diagram , then complete :



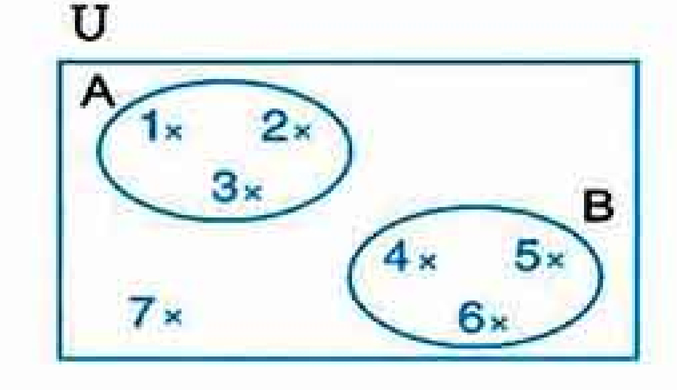
a U = ...

b A = ...

c À = ...

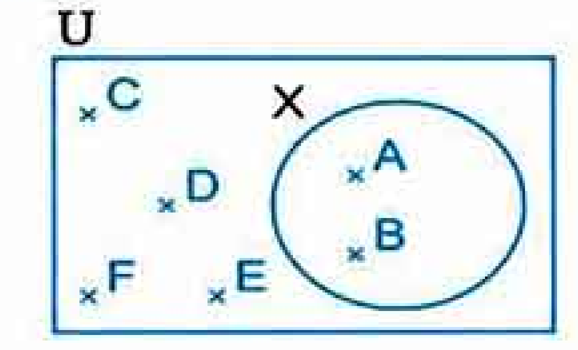
Lesson 7

4 Using the opposite Venn diagram , complete :



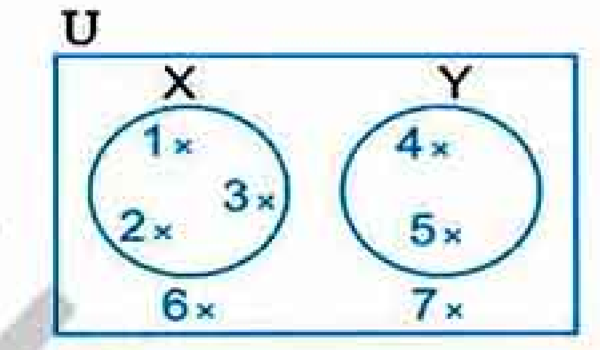
a $U = \{ \dots\dots\dots \}$
b $A = \{ \dots\dots\dots \}$
c $B = \{ \dots\dots\dots \}$
d $\grave{A} = \{ \dots\dots\dots \}$
e $\grave{B} = \{ \dots\dots\dots \}$

5 Look at the opposite Venn diagram , then complete :



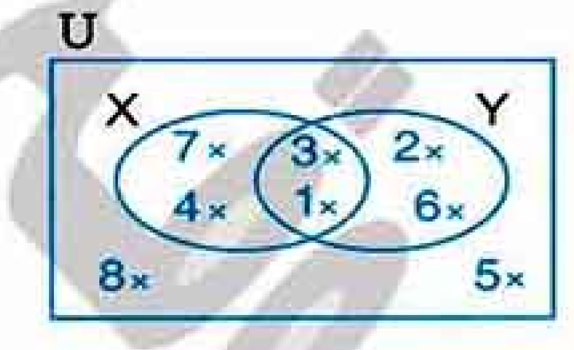
a $U = \dots\dots\dots$
b $X = \dots\dots\dots$
c $\grave{X} = \dots\dots\dots$
d $X \cap \grave{X} = \dots\dots\dots$
e $X \cup \grave{X} = \dots\dots\dots$

6 Study the opposite Venn diagram , then complete :



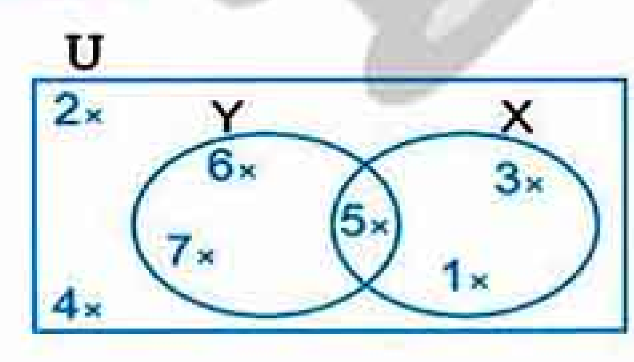
a $\grave{X} = \dots\dots\dots$
b $\grave{Y} = \dots\dots\dots$
c $X \cap Y = \dots\dots\dots$
d $(X \cap Y)\grave{} = \dots\dots\dots$
e $X \cup Y = \dots\dots\dots$
f $(X \cup Y)\grave{} = \dots\dots\dots$
g $\grave{X} \cap X = \dots\dots\dots$
h $\grave{X} \cap \grave{Y} = \dots\dots\dots$
i $\grave{X} \cup \grave{Y} = \dots\dots\dots$

7 Study the opposite Venn diagram , then complete :



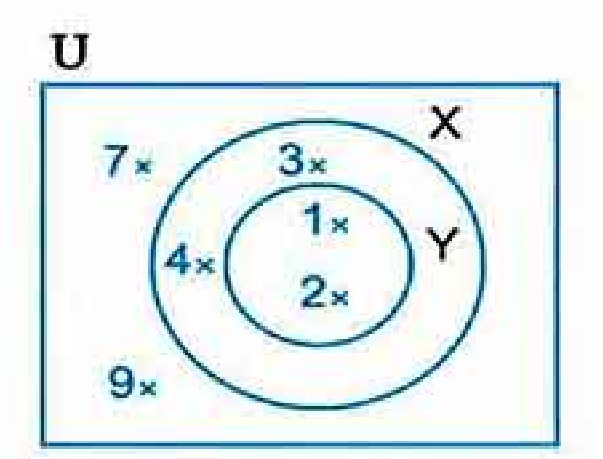
a $\grave{X} = \{ \dots\dots\dots \}$
b $\grave{Y} = \{ \dots\dots\dots \}$
c $\grave{X} \cup \grave{Y} = \{ \dots\dots\dots \}$
d $\grave{X} \cap \grave{Y} = \{ \dots\dots\dots \}$
e $(X \cup Y)\grave{} = \{ \dots\dots\dots \}$
f $(X \cap Y)\grave{} = \{ \dots\dots\dots \}$

8 Look at the opposite Venn diagram , then complete :



a $U = \dots\dots\dots$
b $X = \dots\dots\dots$
c $Y = \dots\dots\dots$
d $\grave{X} = \dots\dots\dots$
e $\grave{Y} = \dots\dots\dots$
f $Y \cup X = \dots\dots\dots$
g $Y \cap X = \dots\dots\dots$
h $(Y \cup X)\grave{} = \dots\dots\dots$

9 Look at the opposite Venn diagram , then complete :



a $X \cap Y =$ ....
b $(X \cap Y)' =$ ....
c $X \cup Y =$ ....
d $(X \cup Y)' =$ ....
e $X' \cap Y' =$ ....
f $X' \cup Y' =$ ....
g $U \cap X =$ ....
h $U \cup Y =$ ....
i $U' =$ ....
j $\varnothing \cap U =$ ....

10 If U is the set of the factors of 12 and A is the set of the factors of 6 , find : A'

11 If U is the set of the even numbers less than 16 ,
$A = \{4, 6, 10, 12\}$ and $B = \{2, 6, 8, 14\}$
Find each of the following :
$A \cup B$, $(A \cup B)'$, $A \cap B$, $(A \cap B)'$

12 If $U = \{1, 2, 3, 4, 5, 7, 9, 10\}$, $X = \{3, 4, 10\}$ and $Y = \{3, 9, 1\}$
Find each of the following :

a X'
b Y'
c $X \cap Y$
d $(X \cap Y)'$
e $(X \cup Y)'$
f $X' \cap Y'$

13 If $U = \{1, 2, 3, 4, 5, 6\}$, $X = \{3, 4, 5\}$ and $Y = \{1, 2, 3\}$
Find each of the following sets :

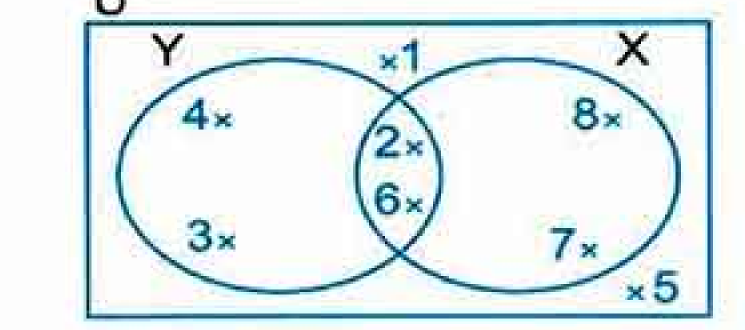
a X'
b Y'
c $X \cap Y$
d $(X \cap Y)'$
e $X \cup Y$
f $(X \cup Y)'$
g $X' \cup Y'$
h $X' \cap Y'$

14 If U is the set of the odd numbers less than 20 , $X = \{1, 5, 15, 3\}$ and $Y = \{1, 5, 19, 13\}$ Find the following :

a $X \cap Y$
b $(X \cap Y)'$
c $X \cup Y$
d $(X \cup Y)'$
e $X' \cap Y'$
f $X' \cap X$
g $X' \cup Y$



15 The opposite Venn diagram of U , X and Y use the symbols $\cup$, $\cap$ or the complement to express each of the following sets :



a $\{1 , 3 , 4 , 5\}$

b $\{1 , 5 , 7 , 8\}$

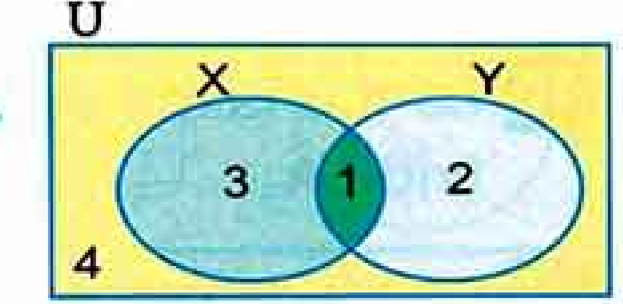
c $\{1 , 5\}$

d $\{1 , 3 , 4 , 5 , 7 , 8\}$

e $\{3 , 4\}$

f $\{7 , 8\}$

16 The opposite Venn diagram of U , X and Y use the symbols $\cup$, $\cap$ or the complement to express each of the following section 1 , 2 , 3 and 4 :



a section 1

b sections 3 and 4

c sections 2 and 4

d section 4

e setcions 2 , 3 and 4

17 Let U be the universal set. Suppose that X and Y are two subsets of U Complete each of the following :

a $X \cup X' =$ .... , $X \cap X' =$ .... , $(X')' =$ ....

b $X' \cup U =$ .... , $X' \cap U =$ .... , $X' \cup \varnothing =$ .... , $X' \cap \varnothing =$ ....

c $U' =$ .... , $\varnothing' =$ ....

Challenge

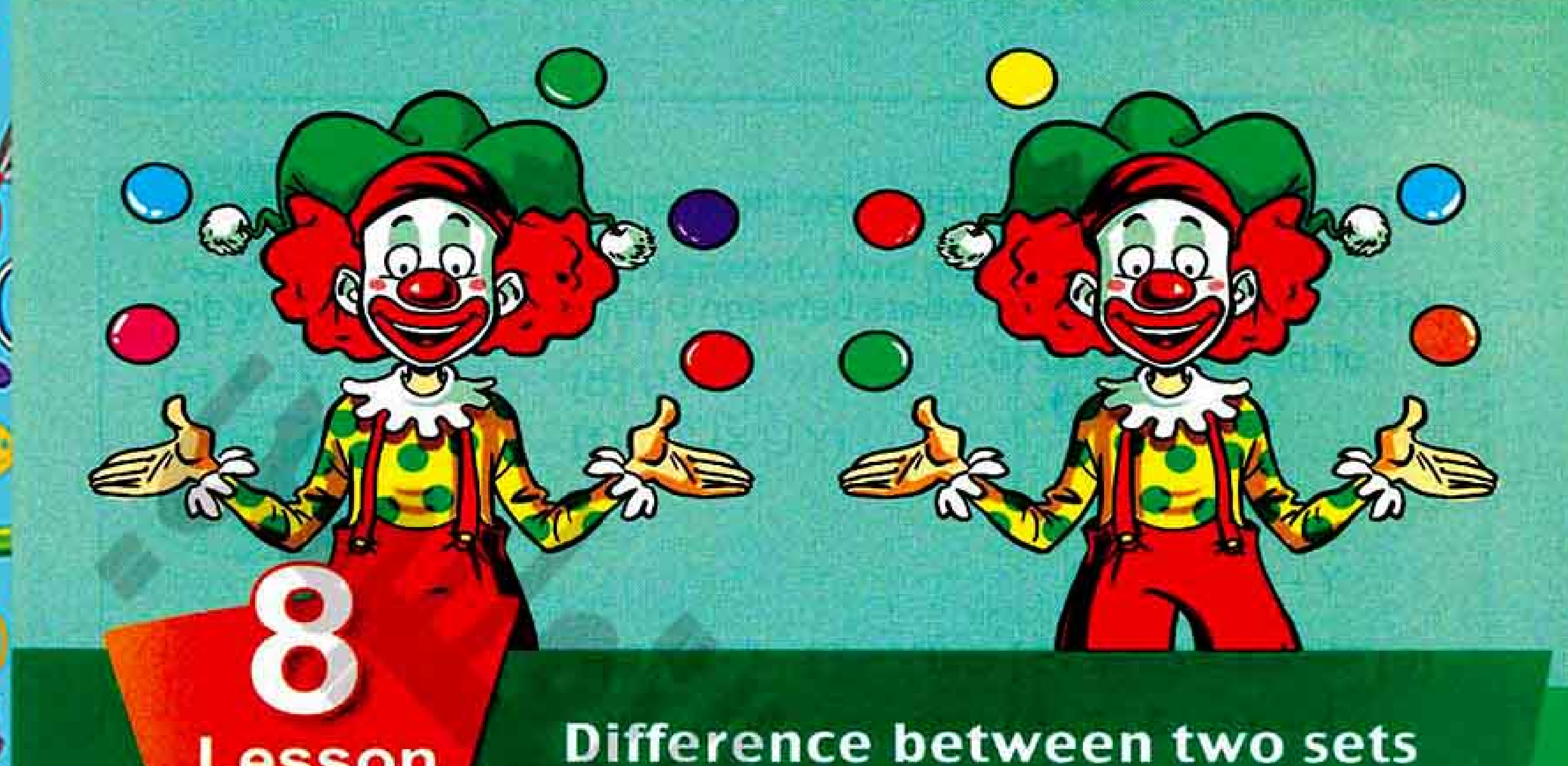
18 Let U be the set of whole numbers between 1 and 10 , $X' = \{3 , 5 , 7\}$ and $Y' = \{9 , 3 , 4\}$:

a Write the sets U , X and Y by the listing method.

b Represent the three sets by a Venn diagram.

c Find : $X \cap Y$, $X \cup Y$, $X' \cap Y$, $X \cup Y'$, $(X \cap Y)'$ and $(X \cup Y)'$





8 Lesson Difference between two sets

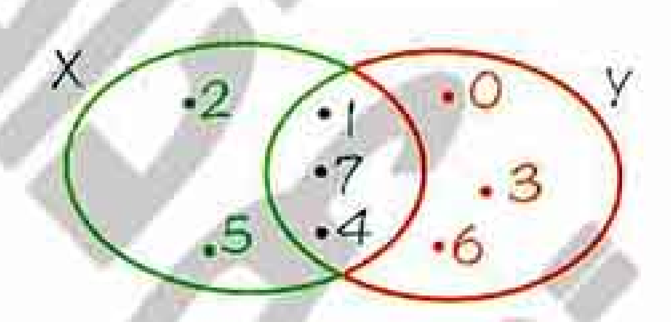
X difference Y

is the set of elements that belongs to X and does not belong to Y , it is written as "X − Y"

Y difference X

is the set of elements that belongs to Y and does not belong to X , it is written as "Y − X"

For Example :



If X = {1 , 2 , 4 , 5 , 7}
and Y = {0 , 1 , 3 , 4 , 6 , 7} , then :

- X − Y = {2 , 5}
- Y − X = {0 , 3 , 6}

Notice

$X - Y \neq Y - X$



Example 1

Draw a Venn diagram to represent the two sets X and Y , then find X − Y and Y − X :

[a] X = {2 , 5 , 6} and Y = {3 , 4 , 5 , 6}

[b] X = {3 , 2 , 5} and Y = the set of digits of the number 610



[c] X = the set of letters of the word "test" and Y = the set of letters of the word "sets".

[d] X = the set of even numbers between 0 and 8 and Y = the set of digits of the number 46210

Solution



[a] • $X - Y = \{2\}$

• $Y - X = \{3, 4\}$

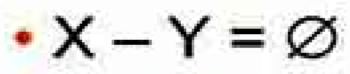
[b] Since $X = \{3, 2, 5\}$ and $Y = \{6, 1, 0\}$, then:

• $X - Y = \{3, 2, 5\} = X$

• $Y - X = \{6, 1, 0\} = Y$

i.e. **If X and Y are two sets such that : $X \cap Y = \varnothing$, then :**

• $X - Y = X$ • $Y - X = Y$



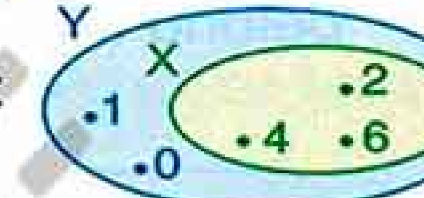
[c] Since $X = \{t, e, s\}$ and $Y = \{s, e, t\}$, then :

• $X - Y = \varnothing$ • $Y - X = \varnothing$

i.e. **If $X = Y$, then :** • $X - Y = \varnothing$ • $Y - X = \varnothing$

[d] Since $X = \{2, 4, 6\}$ and $Y = \{0, 1, 2, 4, 6\}$, then :

• $X - Y = \varnothing$ • $Y - X = \{0, 1\}$



i.e. **If $X \subset Y$, then : $X - Y = \varnothing$**

Try by yourself

• **Using the opposite figure , complete :**

[a] $X - Y = \{$ .... $\}$

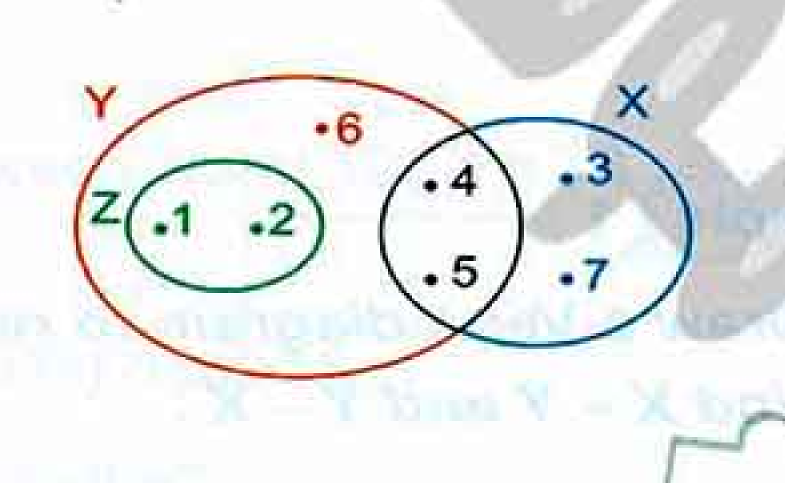
[b] $Y - X = \{$ .... $\}$

[c] $X - Z = \{$ .... $\}$

[d] $Z - X = \{$ .... $\}$

[e] $Y - Z = \{$ .... $\}$

[f] $Z - Y = \{$ .... $\}$



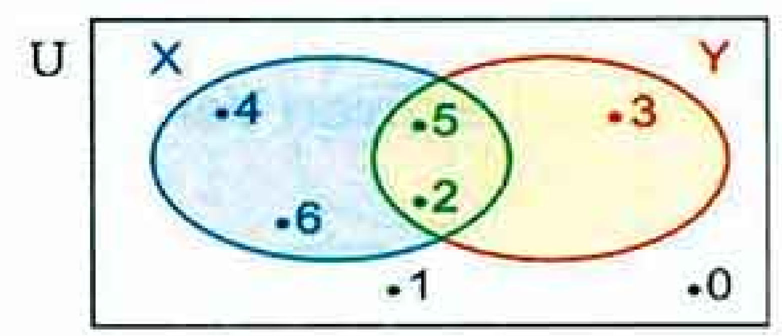




Example 2

Use the opposite Venn diagram to find each of the following :

[a] X – Y
[b] Y – X
[c] X̀ – Y
[d] U – X
[e] U – (X ∩ Y)
[f] U – (X ∪ Y)
[g] (X – Y)̀



Solution

[a] X – Y = {4 , 6}

[b] Y – X = {3}

[c] X̀ = {0 , 1 , 3}, then : X̀ – Y = {0 , 1 , 3} – {2 , 3 , 5} = {0 , 1}

[d] U – X = {0 , 1 , 3} = X̀

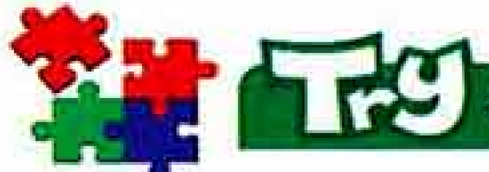
[e] X ∩ Y = {5 , 2}, then :
U – (X ∩ Y) = {0 , 1 , 2 , 3 , 4 , 5 , 6} – {5 , 2} = {0 , 1 , 3 , 4 , 6}

[f] X ∪ Y = {2 , 3 , 4 , 5 , 6}, then :
U – (X ∪ Y) = {0 , 1 , 2 , 3 , 4 , 5 , 6} – {2 , 3 , 4 , 5 , 6} = {0 , 1}

[g] X – Y = {4 , 6} , then : (X – Y)̀ = {0 , 1 , 2 , 3 , 5}

Remarks

1. X – U = ∅ , U – X = X̀ "Where U is the universal set"
2. ∅ – X = ∅ , X – ∅ = X
3. X – X = ∅

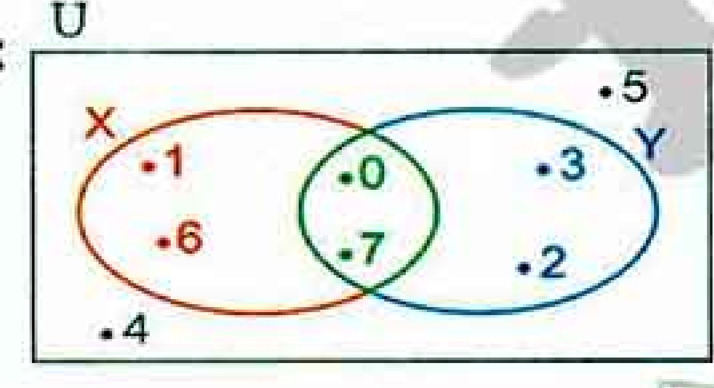


• **Using the opposite figure , complete :**

[a] X – Ỳ = ...

[b] (X – Y)̀ = ...

[c] (Y – X)̀ = ...





Exercise 18

Difference between two sets

From the school book

1 Using the given Venn diagram , complete the following :

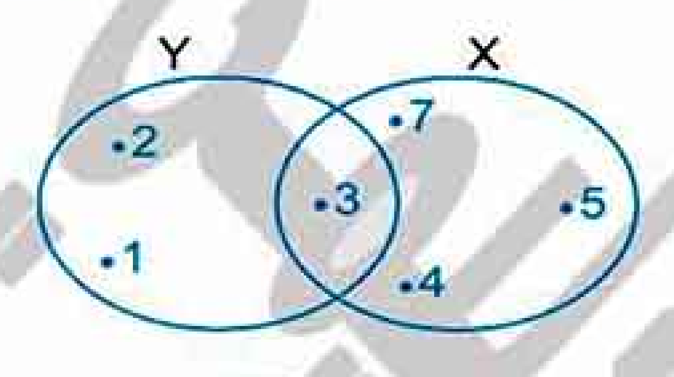


Fig. (1)

a $X - Y =$ ....

b $Y - X =$ ....

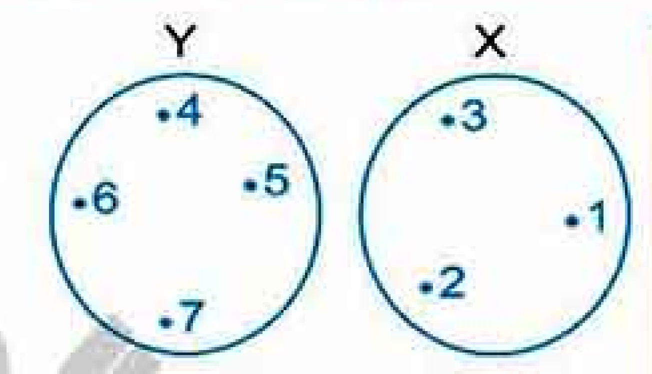


Fig. (2)

a $X - Y =$ ....

b $Y - X =$ ....

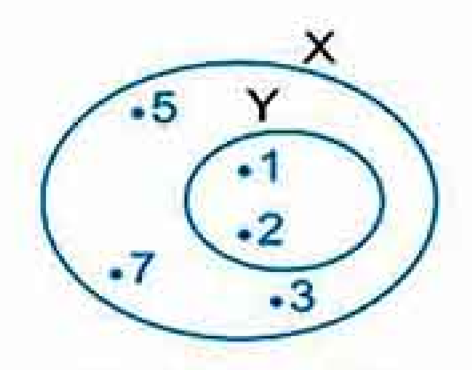


Fig. (3)

a $X - Y =$ ....

b $Y - X =$ ....

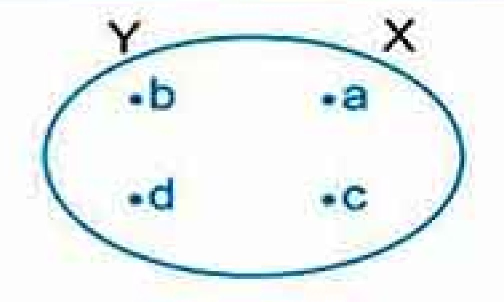


Fig. (4)

a $X - Y =$ ....

b $Y - X =$ ....

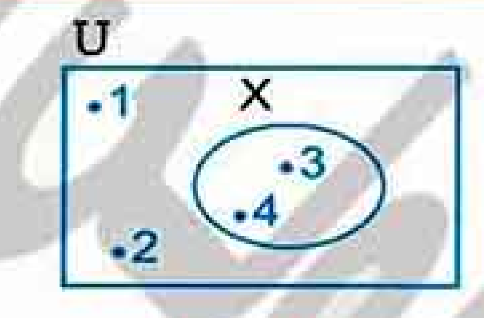


Fig. (5)

a $U - X =$ ....

b $X - U =$ ....

c $U - \grave{X} =$ ....

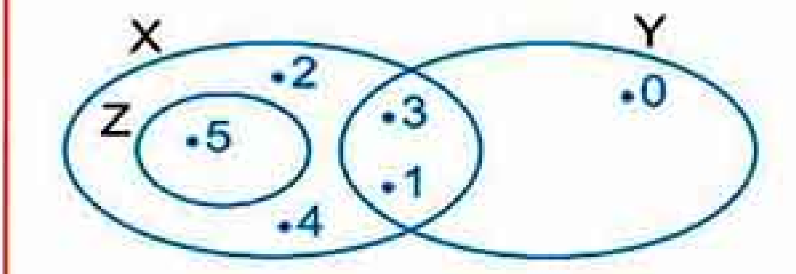


Fig. (6)

a $X - Y =$ ....

b $Y - X =$ ....

c $X - Z =$ ....

d $Z - X =$ ....

2 Find the following :

a $\{1, 2, 4\} - \{2, 4, 6\}$

b $\{a, b, c, d\} - \{a, b, c, o\}$

c $\{3, 4\} - \{4\}$

d $\{10, 15, 13\} - \{10, 15\}$

e $\{7, 8\} - \{8, 7\}$

f $\{2, 5\} - \{3, 4\}$

g $\{5\} - \{1, 2, 5\}$

h $\{2, 5, 7\} - \{8, 10, 2, 7, 5\}$

i $\varnothing - \{1, 2, 3\}$

j $\{5, 6\} - \varnothing$

k $\{33\} - \{3\}$

l $\{45\} - \{5\}$

m $\{52\} - \{25\}$

n $\{\ \ \} - \{0\}$





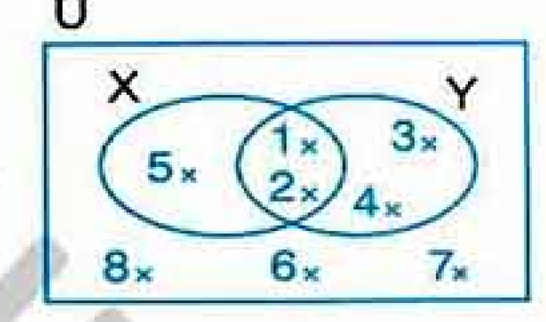
3 The opposite figure represents a Venn diagram for the sets X , Y and Z
Express by using the listing method each of the following :

a $X - Y$
b $Y - X$
c $X - Z$
d $Z - Y$

4 Let $X = \{5, 6, 10, 12\}$, $Y = \{2, 3, 6, 10\}$ and $Z = \{1, 6, 3, 5\}$
List each of the following sets :

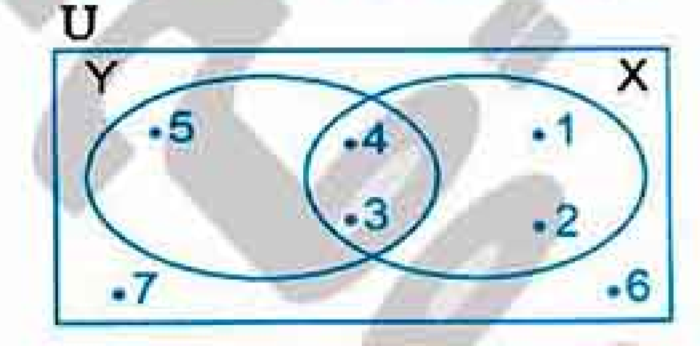
a $X - Y$
b $Y - X$
c $X - Z$
d $Z - X$
e $Y - Z$
f $Z - Y$

5 Use the opposite Venn diagram for the sets U , X and Y to find , using the listing method , each of the following :



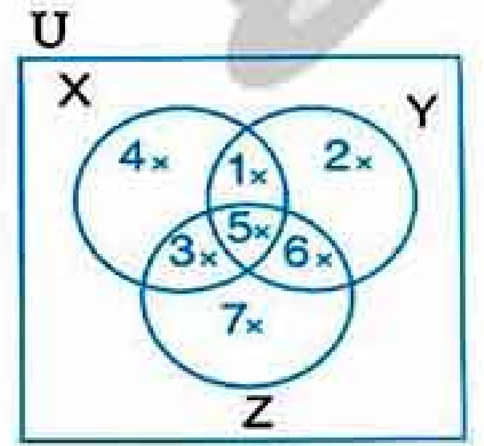
a $X \cap Y$
b $X \cup Y$
c X'
d Y'
e $X - Y$
f $Y - X$
g $(X \cap Y)'$
h $(X \cup Y)'$
i $U - (X \cap Y)$
j $U - (X \cup Y)$
k $(X - Y)'$
l $(Y - X)'$

6 Look at the opposite Venn diagram , then find each of the following :



a $X \cap Y$
b $X \cup Y$
c $X - Y$
d $Y' - X$
e Y'
f $(X \cup Y)'$

7 Use the opposite figure to find by using the listing method each of the following :



a $X - Y$ and $Y - X$
b $X - Z$ and $Z - X$
c $Y - Z$ and $Z - Y$
d $X \cap Y$
e $X \cap Z$
f $Y \cap Z$
g $X \cup Y$
h $X \cup Z$





i $Y \cup Z$ **j** X' **k** Y'

l Z' **m** $X \cap Y \cap Z$ **n** $X \cup Y \cup Z$

8 **Use the opposite figure to find by using the listing method each of the following :**

a $X - Y$ and $Y - X$
b $Y - Z$ and $Z - Y$
c $X - Z$ and $Z - X$
d X'
e Y'
f Z'
g $X \cap Y$
h $Y \cap Z$
i $X \cap Z$
j $X \cup Z$
k $X \cup Y$
l $(X \cap Y)'$
m $(Y \cup Z)'$
n $(Y - X) \cap (Y - Z)$

U
Z Y X
2 4 7 8 1 5 3 9 6
11 10

9 If $U = \{1, 2, 3, 4, 5, 6\}$, $X = \{2, 3, 5\}$ and $Y = \{3, 4, 5\}$
Represent the sets by Venn diagram, then write each of the following by using the listing method :
$X \cup Y$, $X \cap Y$, $X - Y$, X'

10 Let $U = \{a, b, c, d, h, f, r, l, m\}$, $X = \{a, c, d, h\}$, $Y = \{a, b, c, r\}$ and $Z = \{b, c, h, f\}$
Express by using the listing method each of the following :

a $X - Y$ **b** $Y - Z$ **c** $Z - X$
d $X' \cup Y'$ **e** $X' \cap Y'$ **f** $X' - Y'$
g $Y - X'$ **h** $(X - Y) \cup Z$ **i** $(X \cup Y) - Z'$

11 **Complete each of the following :**

a $X - U =$ .... , $U - X =$ ....
b $\varnothing - X =$ .... , $X - \varnothing =$ ....
c $Y - Y =$ ....
d If $X \cap Y = \varnothing$, then $X - Y =$ .... , $Y - X =$ ....
e If $Y \subset X$, then $X \cap Y =$ .... , $X \cup Y =$ .... , $Y - X =$ ....
f If $X = Y$, then $X \cap Y =$ .... , $X \cup Y =$ .... , $X - Y =$ .... , $Y - X =$ ....



12 Find the value of x in each of the following :

a $x \in \{2, 3\} - \{3, 4\}$

b $\{5, 6\} - \{x\} = \{6\}$

c $\{6, 7, 8\} - \{6\} = \{7, x\}$

d $\{2, 3\} - \{3, x\} = \varnothing$

e $\{8, 9, 12\} - \{9, x\} = \{8\}$

f $\{5, 3, 4\} - \{3, 5\} = \{x + 1\}$

g $\{10, 12, 15\} - \{12\} = \{10, 3x\}$

h $\{3, x - 1\} - \{3, 4, 5\} = \{7\}$

13 Write the set represented by the coloured part in each of the following Venn diagrams :

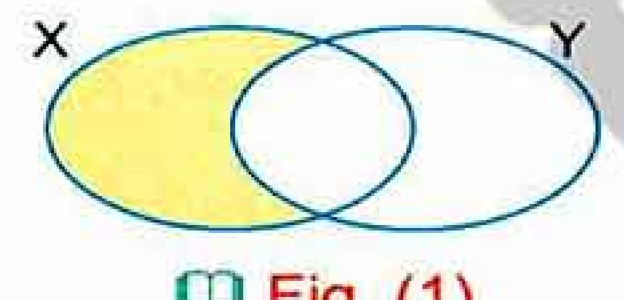


Fig. (1)

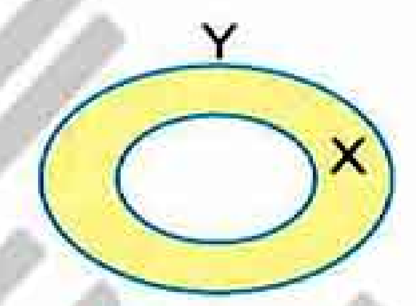


Fig. (2)

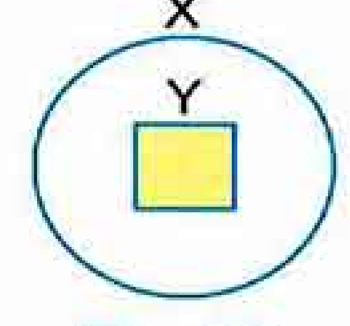


Fig. (3)

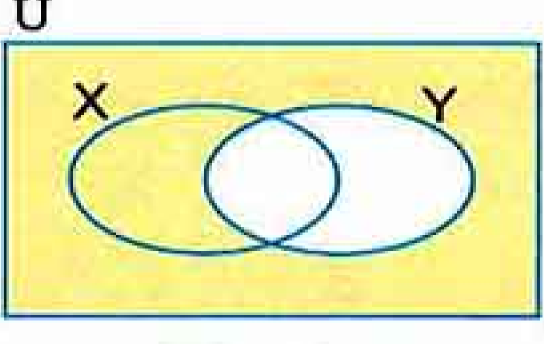


Fig. (4)

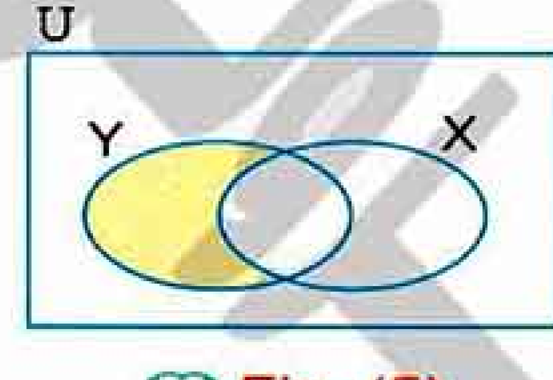


Fig. (5)

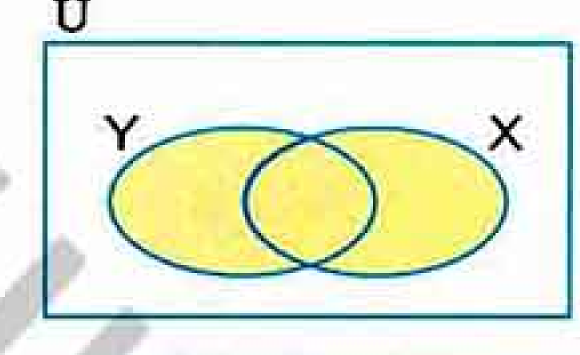


Fig. (6)

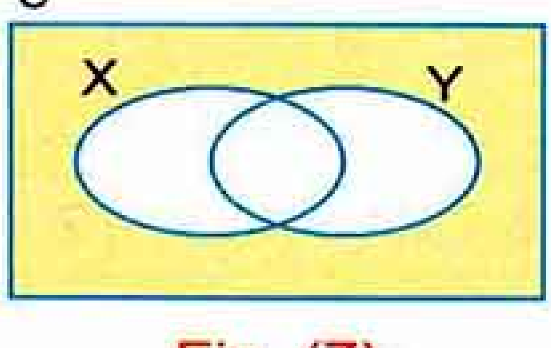


Fig. (7)

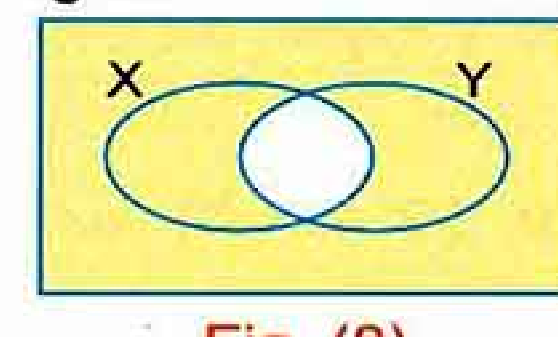


Fig. (8)

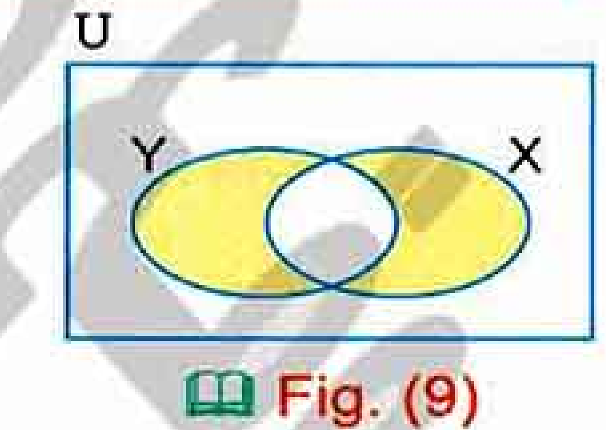


Fig. (9)

Challenge

14 If $X - Y = \{2, 3\}$, $X \cap Y = \{4\}$ and $Y - X = \{6\}$

Represent X and Y by a Venn diagram and list their elements.







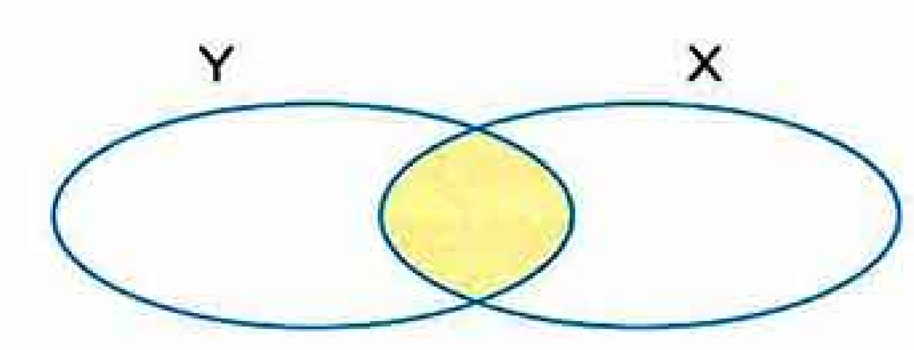
Test on the second part of unit two

Answer the following questions :

1 Choose the correct answer from the given ones :

1. If $X \subset Y$, then $X \cup Y =$ .... (X *or* Y *or* U *or* $\varnothing$)

2. The shaded part in the opposite figure represents = ...



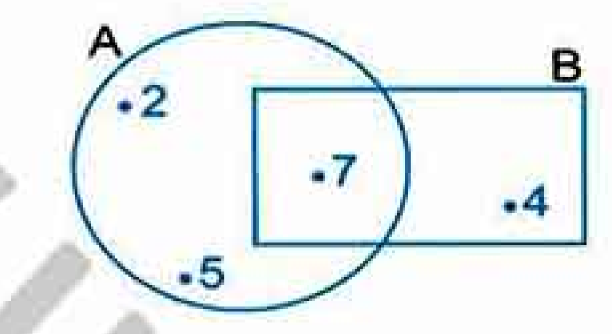
($X \cup Y$ *or* $X - Y$ *or* U *or* $X \cap Y$)

3. $A \cap \grave{A} =$ .... (U *or* A *or* $\varnothing$ *or* $\grave{A}$)

4. $\{6, 7, 8\} - \{7\} =$ .... ($\{6, 8\}$ *or* $\varnothing$ *or* $\{6, 7\}$ *or* $\{7, 8\}$)

5. **In the opposite figure :**

   $A \cup B =$ ....



($\{2, 5, 7\}$ *or* $\{7, 4\}$ *or* $\{5, 7, 4\}$ *or* $\{2, 4, 5, 7\}$)

6. If $X = \{2, 4, 9\}$ and $Y = \{4, 5, 7, 9\}$

   , then $X \cap Y =$ ....

   ($\{4, 9\}$ *or* $\{2, 5, 7\}$ *or* $\{2, 4, 5, 7, 9\}$ *or* $\{2, 9\}$)

7. If $U = \{2, 4, 6, 8, 10\}$ and $A = \{4, 8, 10\}$, then $\grave{A} =$ ....

   ($\varnothing$ *or* U *or* $\{2, 6\}$ *or* $\{2, 4, 6\}$)

8. If A is the set of factors if 18 and $B = \{2, 3, 18\}$

   , then $A - B =$ ....

   ($\{1, 9\}$ *or* $\{1, 6, 9\}$ *or* $\{1, 6, 9, 3\}$ *or* $\varnothing$)

9. If $X = \{3, 5, 7, 13\} \cap \{2, 3, 7, 11\}$, then 7 X

   ($\in$ *or* $\notin$ *or* $\subset$ *or* $\not\subset$)



10 If $\{5, 3\} - \{3, m\} = \varnothing$, then m = ... (0 or 1 or 3 or 5)

11 If $K = \{2, 4, 8, 12\} \cup \{5, 4, 8, 9\}$
, then $\{2, 3, 4\}$ .... K ($\in$ or $\notin$ or $\subset$ or $\not\subset$)

12 If $X - Y = X$, then $X \cap Y$ = ... (X or Y or U or $\varnothing$)

13 $\varnothing \cap \{0, 1, 2\}$ = ... ($\{0\}$ or $\varnothing$ or $\{1\}$ or $\{0, 1, 2\}$)

14 $\{1\} \cup \{7\}$ = ... ($\{17\}$ or $\{71\}$ or $\{1, 7\}$ or $\{11, 77\}$)

2 Complete the following :

15 $A \cup \grave{A}$ = ...

16 If $A \cap B = A$, then .... $\subset$ ....

17 If $A \subset B$, then $A - B$ = ...

18 In the opposite figure :



$(X \cup Y)\grave{}$ = ...

U: X {3, 8, 4}, Y {4, 9}; 2, 5 outside

19 If $A \cap B = \varnothing$, then A and B are ....



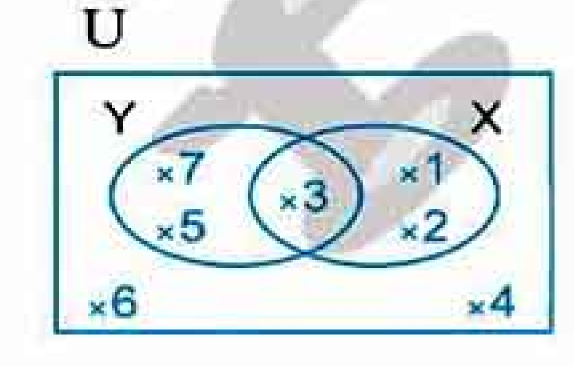
20 $\{2, 3, 5\} \cup \{3, 4\}$ = ...

21 $\{2, 5, 8, 10, 13\} \cap$ The set of multiples of 5 = ...

22 $\{7\} - \{1, 5, 7\}$ = ...

3 Answer the following :

23 From the opposite Venn diagram , find :



[a] $X \cap Y$ [b] $X \cup Y$

[c] $X - Y$ [d] $\grave{X}$

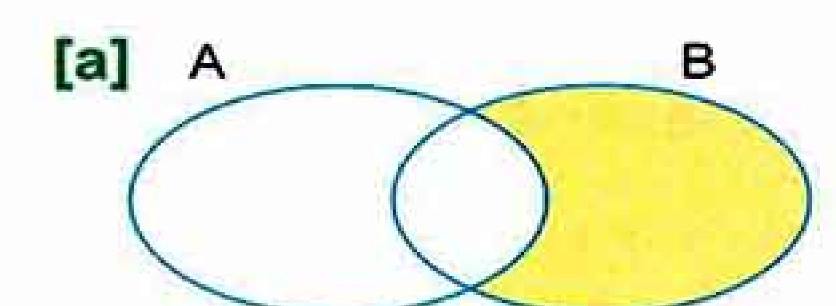
[e] U

....

....

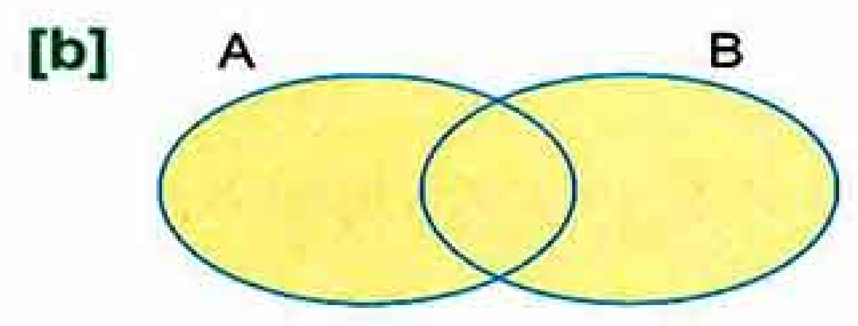
24 Write the relation between the two sets A and B which represent the shaded part of each shape :

[a]



....

[b]



....

25 If U = {1 , 2 , 3 , 4 , 5 , 6 , 7 , 8}
, X = {2 , 4 , 5 , 6} and Y = {4 , 5 , 7}
Represent these sets by Venn diagram
, then find :

[a] $X \cap Y$

[b] $Y - X$

[c] Y`

[d] $(X \cup Y)$`

26 Find the value of x in each of the following :

[a] $\{2, 3\} \cup \{2, x\} = \{2, 3, 5\}$

[b] $\{8, 4, x\} \cap \{9, 7, 4\} = \{9, 4\}$

[c] $\{1, 3\} - \{x\} = \{3\}$





Unit Three

Geometry

1 The circle.

2 Drawing a triangle given the lengths of its three sides.

3 Drawing line segments from the vertices of a triangle perpendicular to its opposite sides.

- Test on the unit three.

Unit Aims

By the end of this unit, student should be able to :

- know the definition of the circle.
- recognize the centre, the radius, the chord and the diameter of a circle.
- draw a circle given its radius lengths.
- draw a triangle given the lengths of its three sides.
- recognize the altitude of a triangle and its length (height).
- draw the altitudes of a triangle.
- determine the location of the intersection point of the altitudes of a triangle.





Lesson 1
The circle

Dishes. Tyres. Rings.

Definition of a circle

The **circle** is a closed curve , all the points on it having the same distance from a fixed point.

The fixed point is called the **"centre"** of the circle.

The constant distance is called the "radius length" of the circle , it is denoted by r

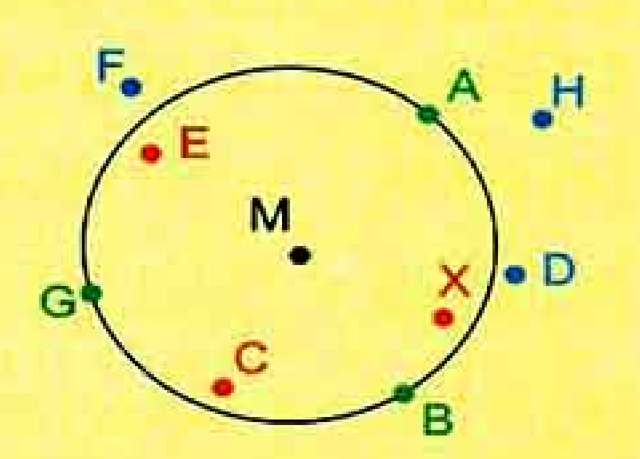
- A capital letter is used to designate the centre of a circle.
- A circle is named by its centre , so we name the circle M when its centre is M

Note that

In the opposite figure :

M is a circle , then there are 3 sets of points :

1. Points located on the circle M ,
   such as : A , B and G
2. Points located inside the circle M ,
   such as : C , E and X
3. Points located outside the circle M ,
   such as : D , F and H



Remark

In the opposite figure :

If M is a circle of radius r :

1. The point A is on the circle M (A ∈ circle M) , then :
   MA = r
2. The point B is inside the circle M , then :
   MB < r
3. The point C is outside the circle M , then :
   MC > r



Example 1

If M is a circle of radius length 5 cm. , A , B and C are three points such that : MA = 4 cm. , MB = 7.5 cm. and MC = 5 cm.

Complete using (on , outside or inside) :

[a] Point A is located .... the circle. [b] Point B is located .... the circle.

[c] Point C is located .... the circle. [d] Point M is located .... the circle.

Solution

[a] inside [because MA < r] [b] outside [because MB > r]

[c] on [because MC = r] [d] inside [because it is the centre]









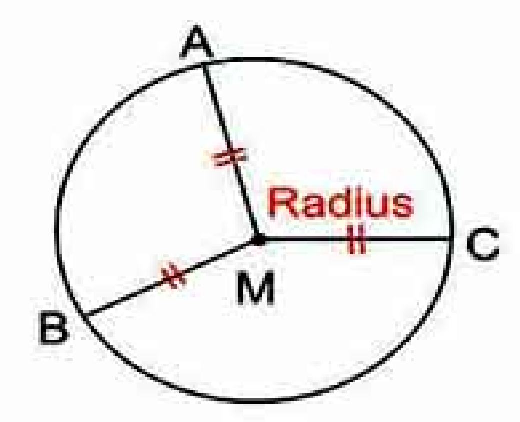
- If M is a circle of radius length 3 cm.
  Complete the following :

  [a] If MA = 3 cm. , then point A is located .... the circle.

  [b] If MB = 2 cm. , then point B is located .... the circle.

  [c] If MC = 5 cm. , then point C is located .... the circle.

The radius of a circle



The radius of a circle is a line segment whose endpoints are the centre of the circle , and any point on the circle.

For Example :

Each of $\overline{MA}$, $\overline{MB}$ and $\overline{MC}$ is a radius of the circle M

Note that

- All radii of a circle are equal in length.
  i.e. MA = MB = MC = r "Where r is the length of the radius"
- We can draw an infinite number of radii in a circle.

A chord in a circle

A chord in a circle is a line segment that connects between any two points on the circle.

For Example :

Each of $\overline{AB}$ and $\overline{CD}$ is a chord in the circle M

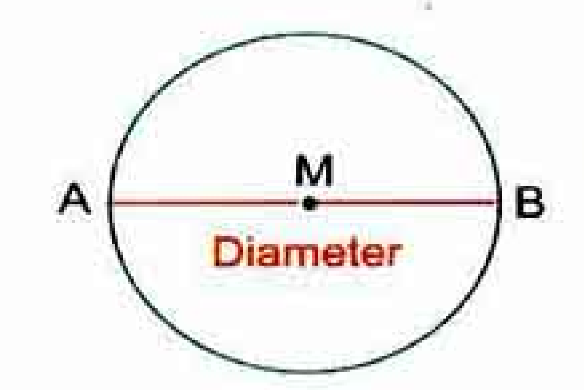
Note that

- $\overline{XY}$ is not a chord in the circle M, because Y is not on the circle M
- We can draw an infinite number of chords in a circle.





The diameter of a circle



The diameter of the circle is a chord that crosses the centre of the circle.

For Example :

$\overline{AB}$ is a diameter in the circle M

Note that

- The diameter of the circle is the longest chord.
- All diameters of a circle are equal in length.
- The length of any diameter in a circle is equal to twice the length of its radius.

  i.e. The length of the diameter = 2 × the length of the radius.

$$d = 2 \times r$$

- We can draw an infinite number of diameters in a circle.

Drawing the circle

- The compasses is used to draw a circle.
- To draw a circle, we have to know the length of its radius.





Example 2

Draw a circle M of radius length 2 cm.

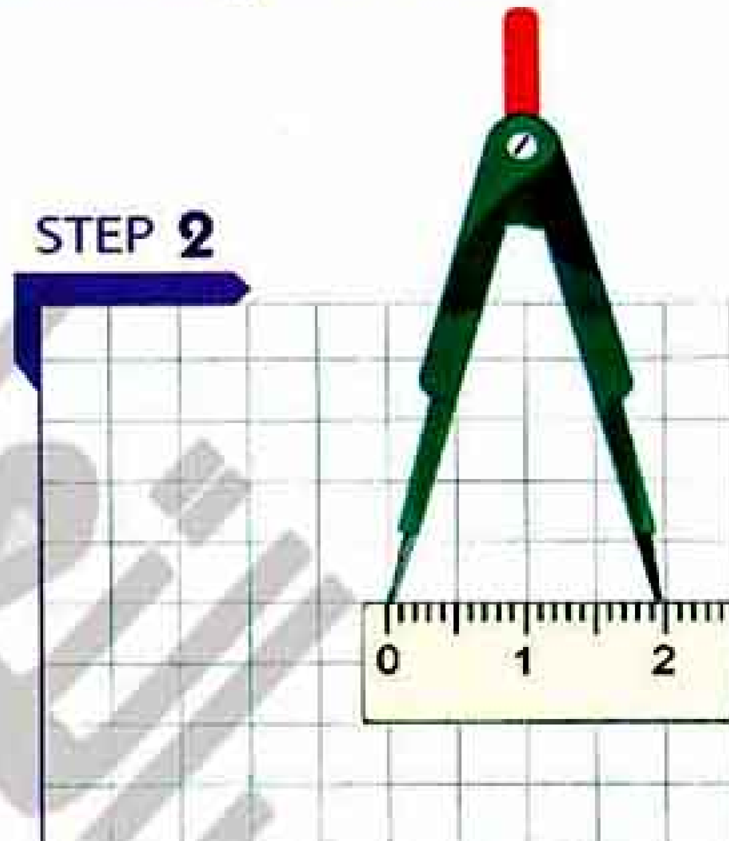
Solution

STEP 1

M

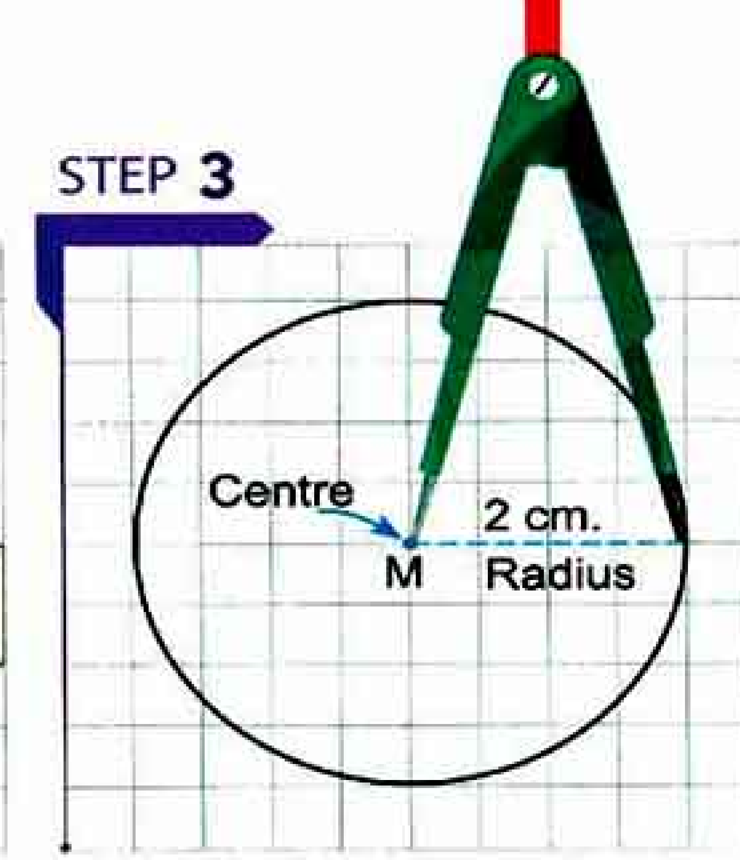
Mark a point M on a piece of paper

STEP 2



Open the compasses such that the distance between the metal tip and the pencil is 2 cm.

STEP 3



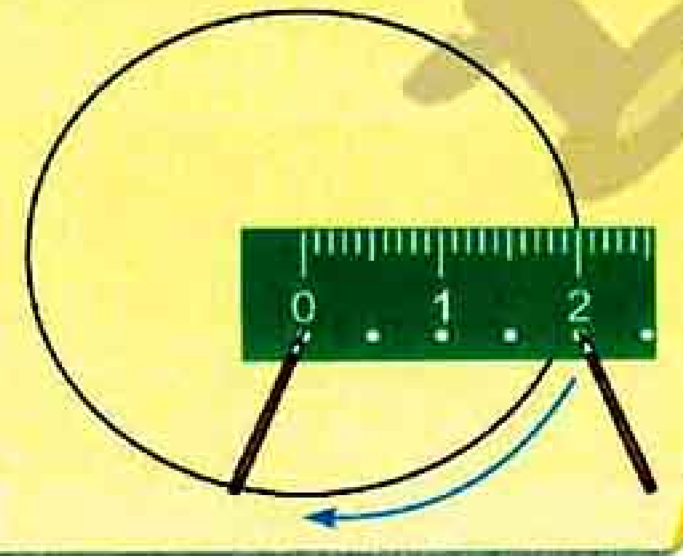
Put the metal tip on the point M and swing the pencil around to draw a closed curve that is the circle M of radius length 2 cm.

Note that

You can use your free gift **"Circles Ruler"** to draw the previous circle **as follows :**



- Hold the point at "O" by your pen and make it stable.
- Put your pencil on the point at "2" and rotate the ruler.

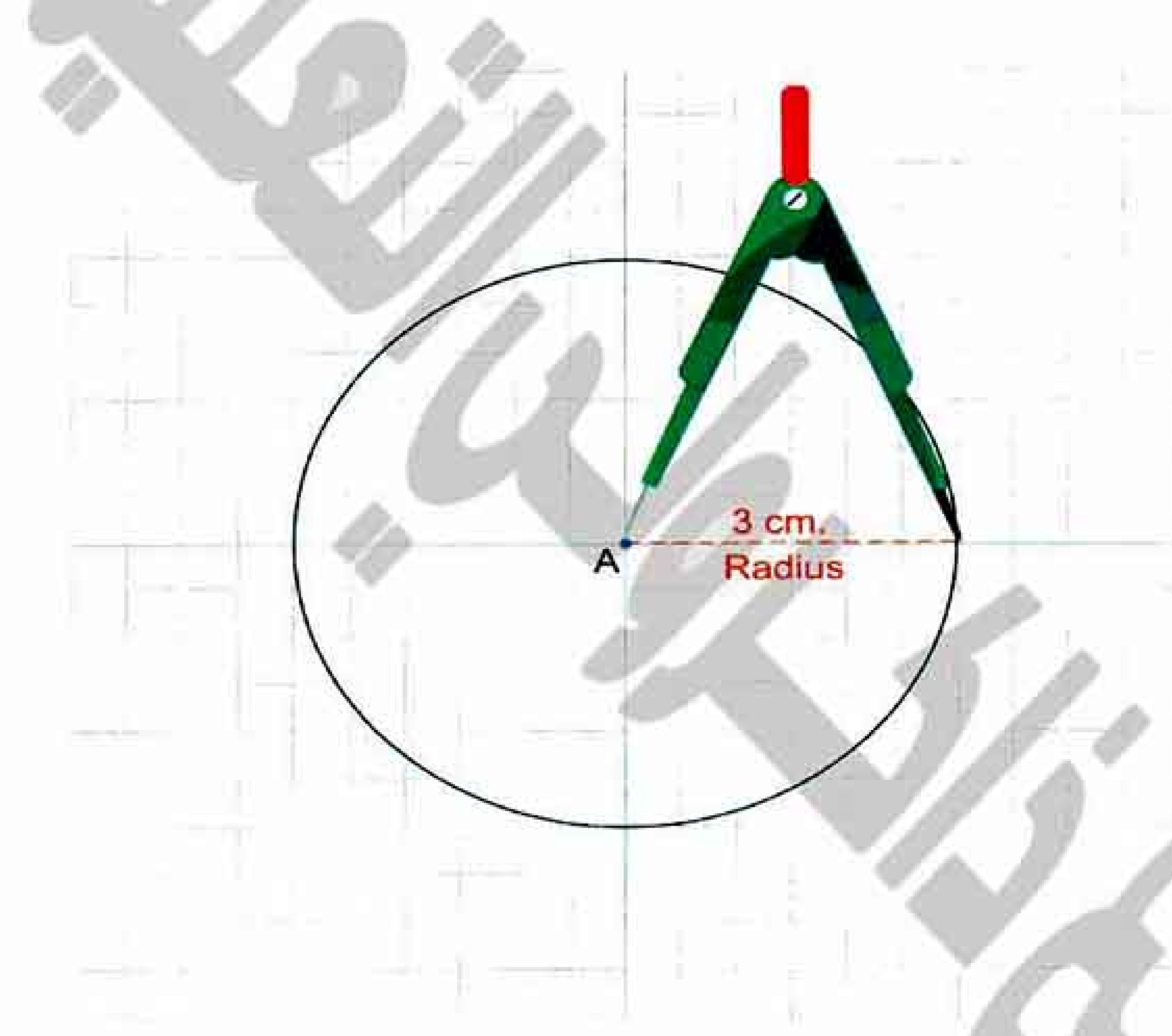


Example (3)

Draw a circle A of diameter length 6 cm.

Solution

- Since the diameter length is 6 cm. , then the radius length is $\frac{6}{2}$ = 3 cm.
- Apply the same steps of example 2 to draw the circle A of radius length 3 cm.





- **Draw a circle N of radius length 4 cm.**



Example (4)

Draw a circle M of radius length 2.5 cm. , draw the diameter $\overline{AB}$, draw the chord $\overline{AC}$ of length 3 cm. , then draw the chord $\overline{CB}$

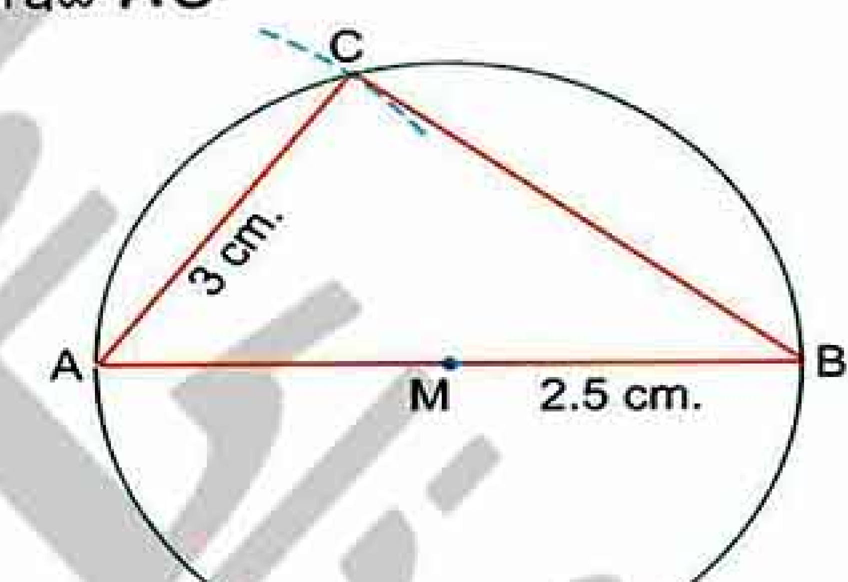
Find without measuring the length of $\overline{AB}$, then find by measuring :

[a] The length of $\overline{CB}$

[b] The measure of $\angle$ BCA

Solution

Hint : To draw the chord $\overline{AC}$ of length 3 cm. , set the compasses to a length equal to the length of the chord, then we put the metal tip on A and draw an arc to intersect the circle at C , then we draw $\overline{AC}$



- Since the radius length is 2.5 cm. , then the diameter length (the length of $\overline{AB}$) $= 2.5 \times 2 = 5$ cm.

  [a] The length of $\overline{CB} = 4$ cm.

  [b] The measure of $\angle$ BCA = 90°





Exercise 19

The circle

From the school book

1 Complete :

a .... is used in drawing the circle

b The lengths of all radii in the same circle are ....

c All the diameters of a circle are .... in length.

d The chord of a circle is a line segment that connects ....

e The diameter is a chord that crosses ....

f The longest chord in a circle is called ....

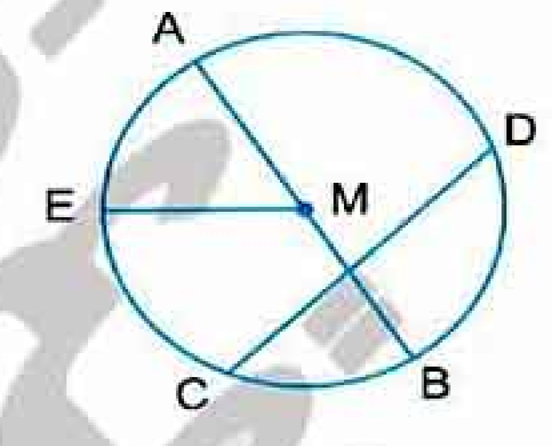
g The midpoint of any diameter in a circle is .... of the circle.

h The diameter length = 2 × the length ....

i If the radius length of a circle is 5 cm. , then the length of the longest chord is .... cm.

j To draw a circle whose diameter length is 7.2 cm. , set the compasses to a length equal to .... cm.

2 In the opposite figure, complete :



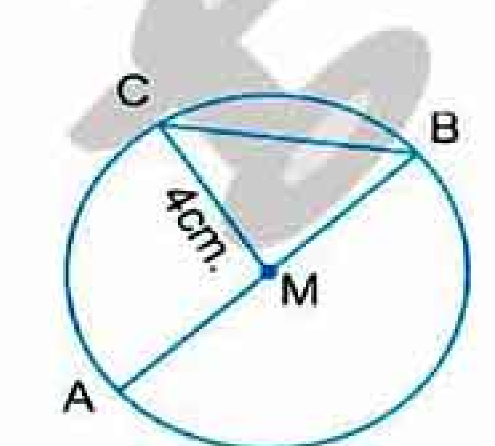
a $\overline{AB}$ is called the .... of the circle.

b $\overline{CD}$ is called the .... of the circle.

c $\overline{EM}$ is the .... of the circle.

d The point M is called the .... of the circle.

3 In the opposite figure, complete :



a .... is called the longest chord.

b .... is called a chord.

c .... is called a radius.

d AB = ... cm.

e MB = ... cm.

f MA = $\frac{1}{2}$ × ....

4 In the opposite figure, there is a circle whose centre is M, complete :

a The radii of the circle are .... , ... , ... , ...

b The diameter of the circle is ....

c The chords of the circle are .... , ... , ... , ...

5 Put (✓) for the correct statement and (×) for the incorrect one :

a If the diameter length of a circle is 6 cm. , then the radius length of this circle is 3 cm. ( )

b Only one diameter can be drawn from any point on the circle. ( )

c The length of the diameter of a circle > the length of any chord which doesn't pass through its centre. ( )

d The diameter of the circle divides it into two equal halves. ( )

e If M is a circle of radius length 10 cm. , and MA = 5 cm. , then the point A is located on the circle M ( )

f If M is a circle of diameter length 6 cm. , and MB = 3 cm. , then the point B is located on the circle M ( )

6 In the opposite figure, put the suitable relation "< , = or >" in each ☐ :

a AB ☐ AX

b AD ☐ AB

c AC ☐ AB

d AD ☐ AX

e EC ☐ EX

f AB ☐ XY

7 Choose the correct answer between brackets :

a Any chord passing through the centre of the circle is called ....
(radius *or* diameter *or* centre)



b Any line segment connects between any two points on the circle is called .... (diameter *or* radius *or* chord)

c The length of the radius = ... the length of the diameter in the same circle. (double *or* half *or* triple)

d The length of the radius of a circle is 8 cm., then the length of the greatest chord in it = ... cm. (4 *or* 16 *or* 12)

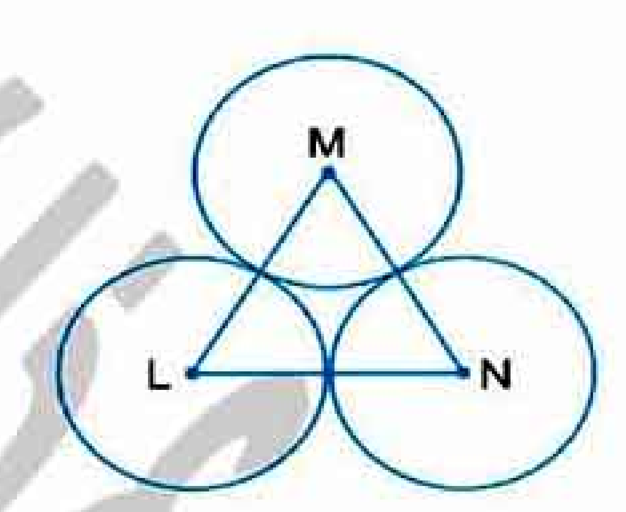
e 📖 If M is a circle whose diameter length is 8 cm. where MA = 7 cm., then the point A is located .... the circle. (inside *or* outside *or* on)

f 📖 If A and B belong to the circle M where $M \in \overline{AB}$, then $\overline{AB}$ is called a .... in the circle. (chord *or* diameter *or* radius)

g 📖 If $\overline{AB}$ and $\overline{AC}$ are two chords in a circle , then $\overline{BC}$ is a .... in the same circle. (chord *or* diameter *or* radius)

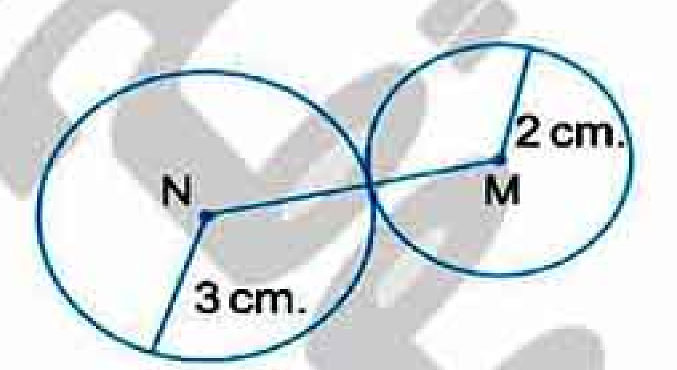
h 📖 **In the opposite figure :**

If the length of each radius in the three circles is 3 cm. , then the perimeter of the triangle MLN equals .... cm. (6 *or* 9 *or* 18)



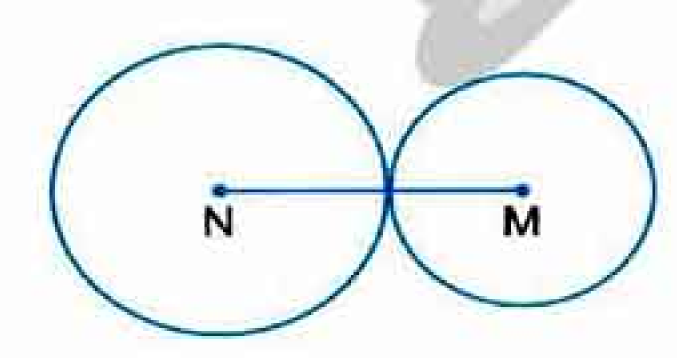
i **In the opposite figure :**

M and N are two circles , then the length of $\overline{MN}$ equals .... cm. (4 *or* 5 *or* 6)



j **In the opposite figure :**

M and N are two circles , their diameters lengths are 6 cm. and 8 cm. respectively , then the length of $\overline{MN}$ is .... cm. (7 *or* 8 *or* 14)





8 **Complete the table :**

Radius	3 cm.	5 cm.	....	....	18 cm.	....	1.8 cm.	....
Diameter	....	....	16 cm.	22 cm.	....	6.8 cm.	....	9.4 cm.

9 **Draw :**

a. A circle M with radius length 3 cm.

b. A circle L with radius length 4 cm.

c. A circle N with radius length 2.5 cm.

d. A circle O with diameter length 10 cm.

e. A circle H with diameter length 9 cm.

f. A circle T in which the length of the longest chord of it is 7 cm.

10 Draw a circle whose center is M and its diameter is 6 cm. , then draw a straight line that passes through the point M and intersects the circle at A and B. Draw another straight line that passes through the point M and intersects the circle at C and D

Complete :

a. $\overline{AB}$ is called .... in the circle.

b. $\overline{CD}$ is called .... in the circle.

c. $\overline{MB}$ is called .... in the circle.

d. Put the suitable relation (> , < or =) :

• AB ☐ CD • MC ☐ 3 cm. • BD ☐ 6 cm.

11 Draw a circle whose centre is M and radius is 2.5 cm. , then draw its diameter $\overline{AB}$ and draw its chord $\overline{AC}$ of length 3 cm. Draw $\overline{BC}$, then find its length.



12 Draw a circle M with diameter $\overline{AB}$ of length 10 cm. and the chord $\overline{BC}$ of length 5 cm. What is the type of triangle ABC and triangle MBC ?

13 **a** Draw a circle of a radius length 2 cm. where M is the center of the circle.

b On the same paper on which you draw the circle , label the following points A , B and C where MA = 1.5 cm. , MB = 3 cm. and MC = 2 cm.

c Complete by choosing (on , outside or inside) the circle to make each sentence true :

- Point A is located .... the circle.
- Point B is located .... the circle.
- Point C is located .... the circle.
- Point M is located .... the circle.

14 Draw a circle whose center is M and radius length 4 cm. , then draw two radii $\overline{MX}$, $\overline{MY}$ and the included angle between them measures 60°, then draw $\overline{XY}$ and find the length of $\overline{XY}$

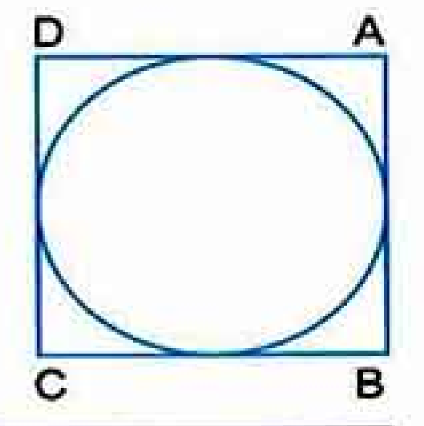
15 Draw a circle with radius length 4.5 cm. , draw the chord $\overline{AB}$ of length 6 cm. and draw an angle BAC of measure 90° to meet the circle at C Measure the length of $\overline{AC}$

16 Draw a circle M with diameter of length 7 cm. , draw the diameter $\overline{AB}$ Draw another circle B of radius length equals MA What is the length of the diameter of the circle B ?

17 Draw the circle M with diameter length 6 cm. , draw two perpendicular diameters $\overline{BD}$ and $\overline{AC}$, then draw $\overline{AB}$, $\overline{BC}$, $\overline{CD}$ and $\overline{DA}$ What can we say about the polygon ABCD ?

18 In the opposite figure :

Find the perimeter of the square ABCD given the length of the circle's radius = 3 cm.



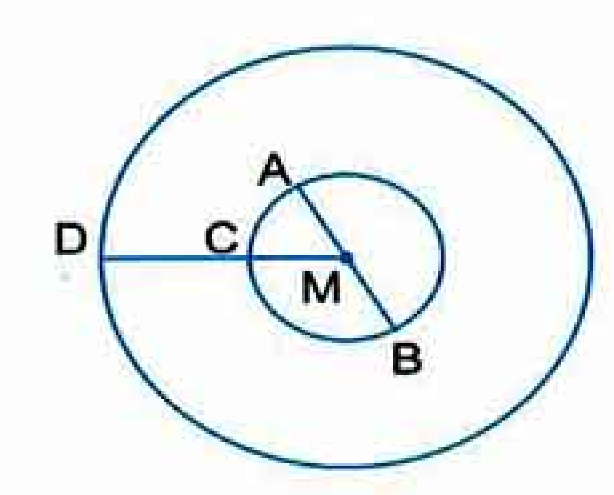
19 In the opposite figure :

There are two circles with the same center M

If their radii are 2 cm. and 5 cm. , complete :

a The length of $\overline{CD}$ = ... cm.

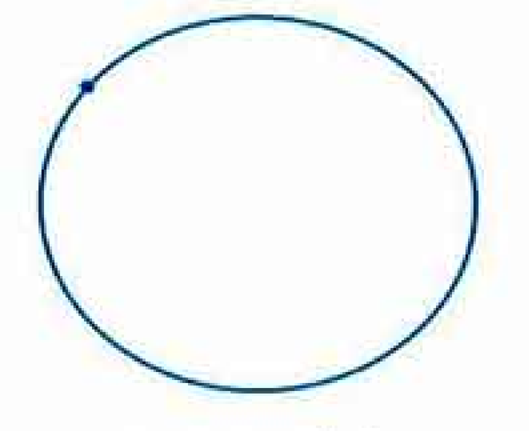
b The length of $\overline{AB}$ = ... cm.

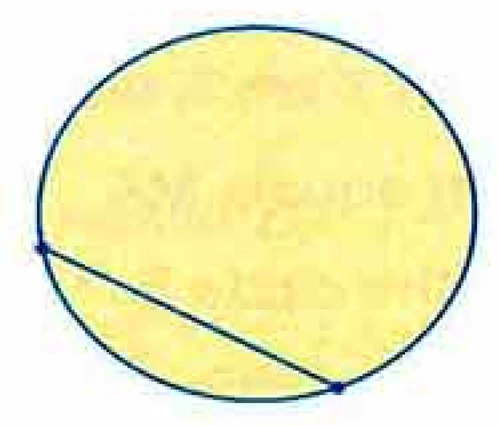


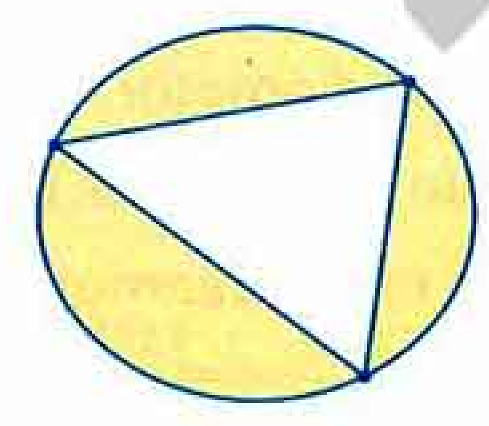
Draw the ray $\overrightarrow{DC}$ from D which intersects the small circle at E and intersects the large circle at F , then find the length of $\overline{DF}$

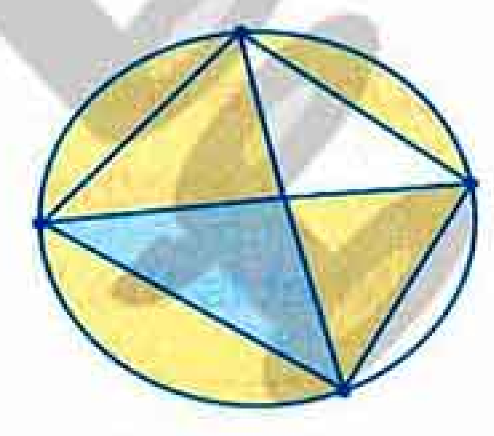
Challenge

20 Notice the pattern by placing points on the circle. Draw the line segments that connect every two points , then you will be able to determine the number of zones which are included in the surface of a circle.

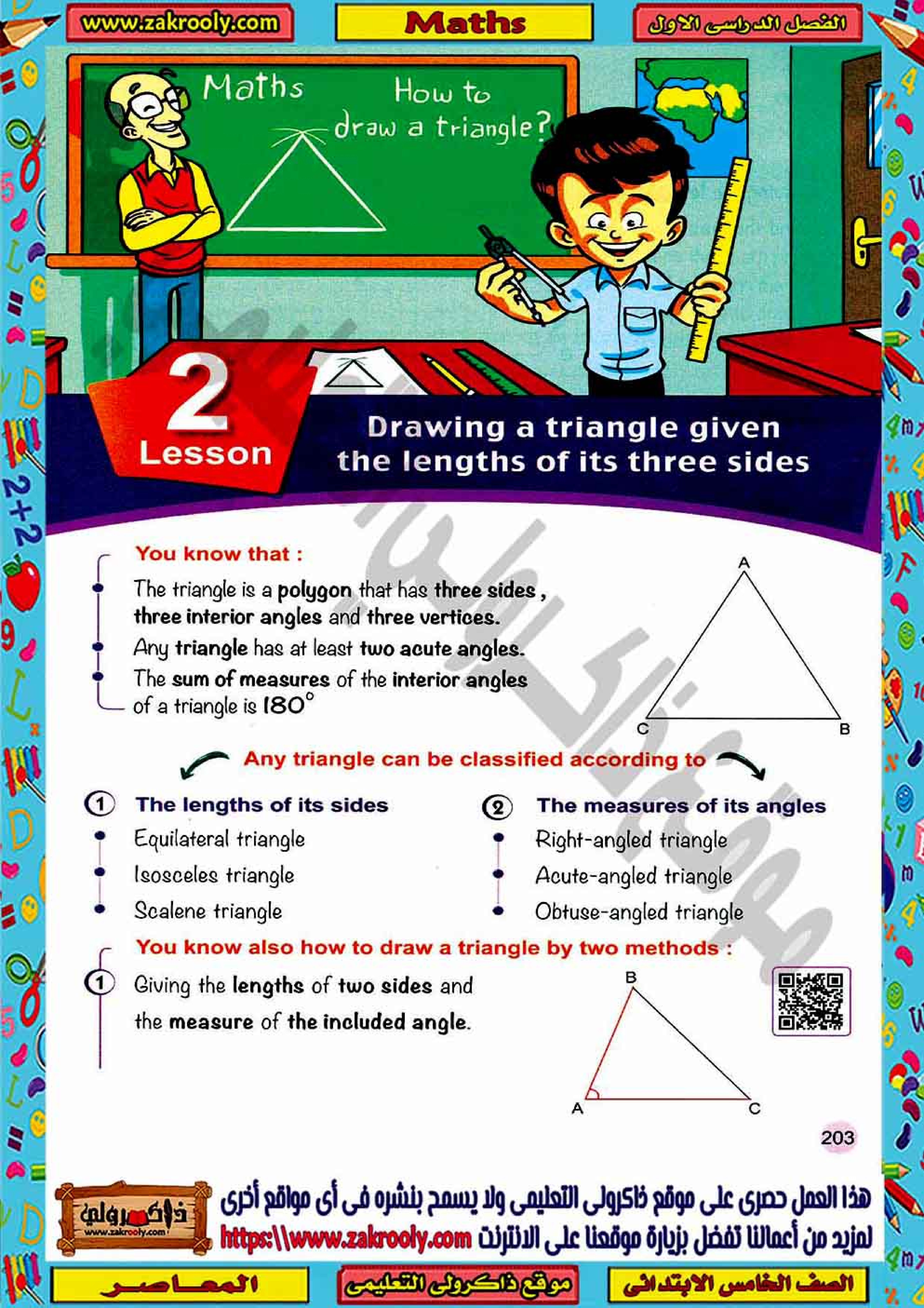

one point
one zone


two points
two zones


three points
four zones


four points
.... zones

How many zones are there on the circle in case of having five points ?



Lesson 2

Drawing a triangle given the lengths of its three sides

You know that :

- The triangle is a **polygon** that has **three sides** , **three interior angles** and **three vertices.**
- Any **triangle** has at least **two acute angles.**
- The **sum of measures** of the **interior angles** of a triangle is **180°**

Any triangle can be classified according to

① The lengths of its sides

- Equilateral triangle
- Isosceles triangle
- Scalene triangle

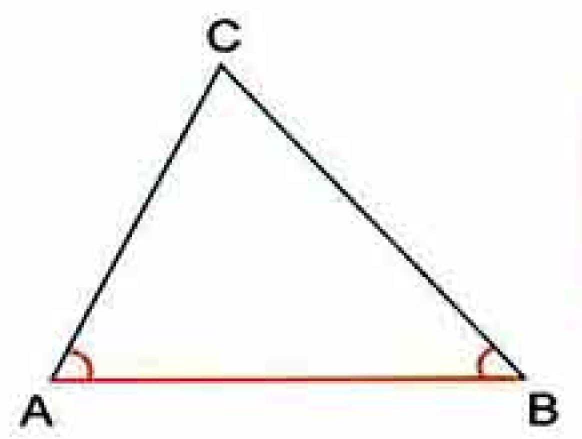
② The measures of its angles

- Right-angled triangle
- Acute-angled triangle
- Obtuse-angled triangle

You know also how to draw a triangle by two methods :

① Giving the **lengths** of **two sides** and the **measure** of **the included angle.**

② Giving the **length** of **one side** and the **measures** of **two angles.**





Now you will study how to draw the triangle giving its side lengths using the geometric instruments.

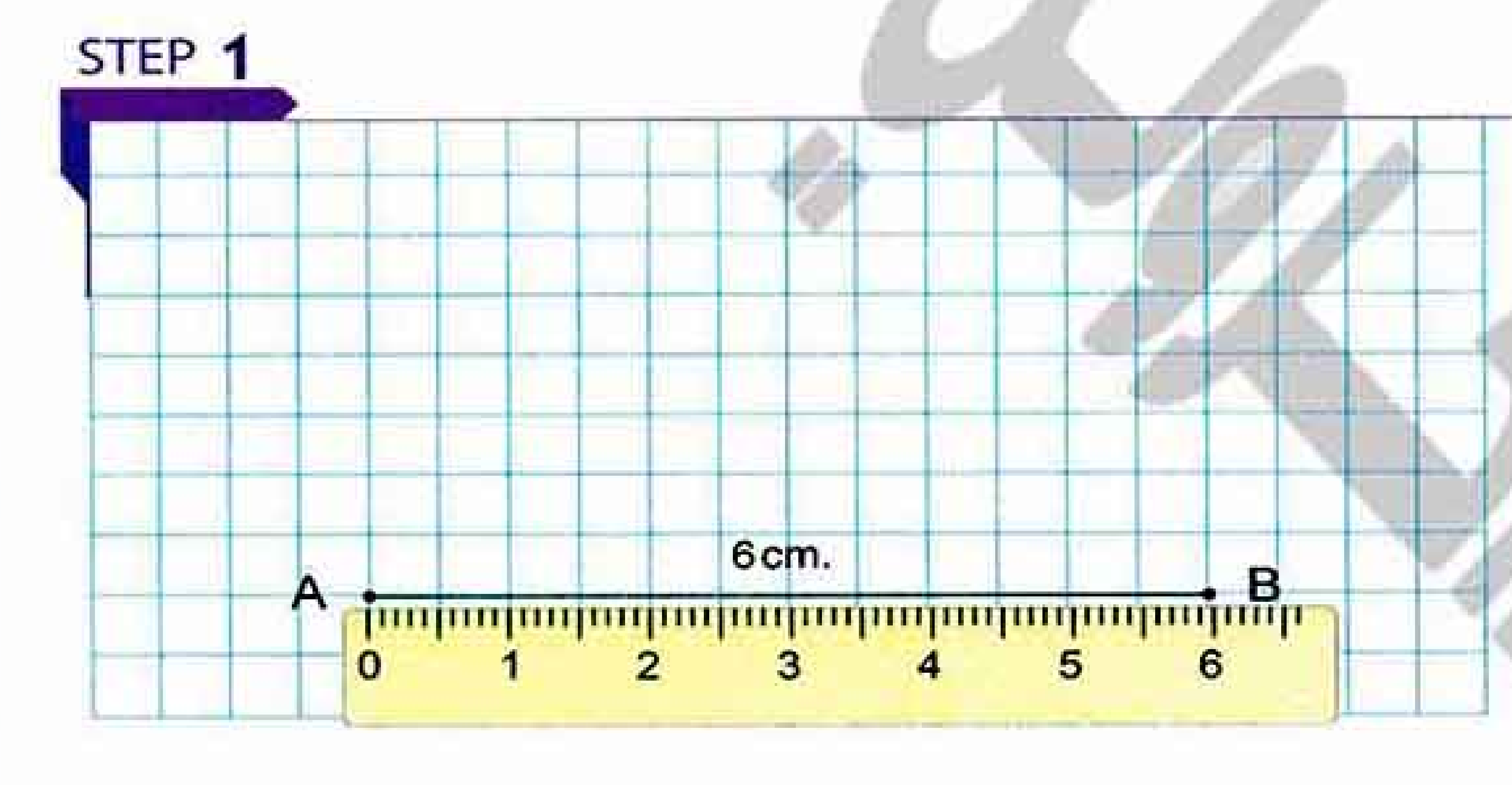


Example 1

Draw the triangle ABC in which AB = 6 cm. , BC = 4 cm. and CA = 5 cm.

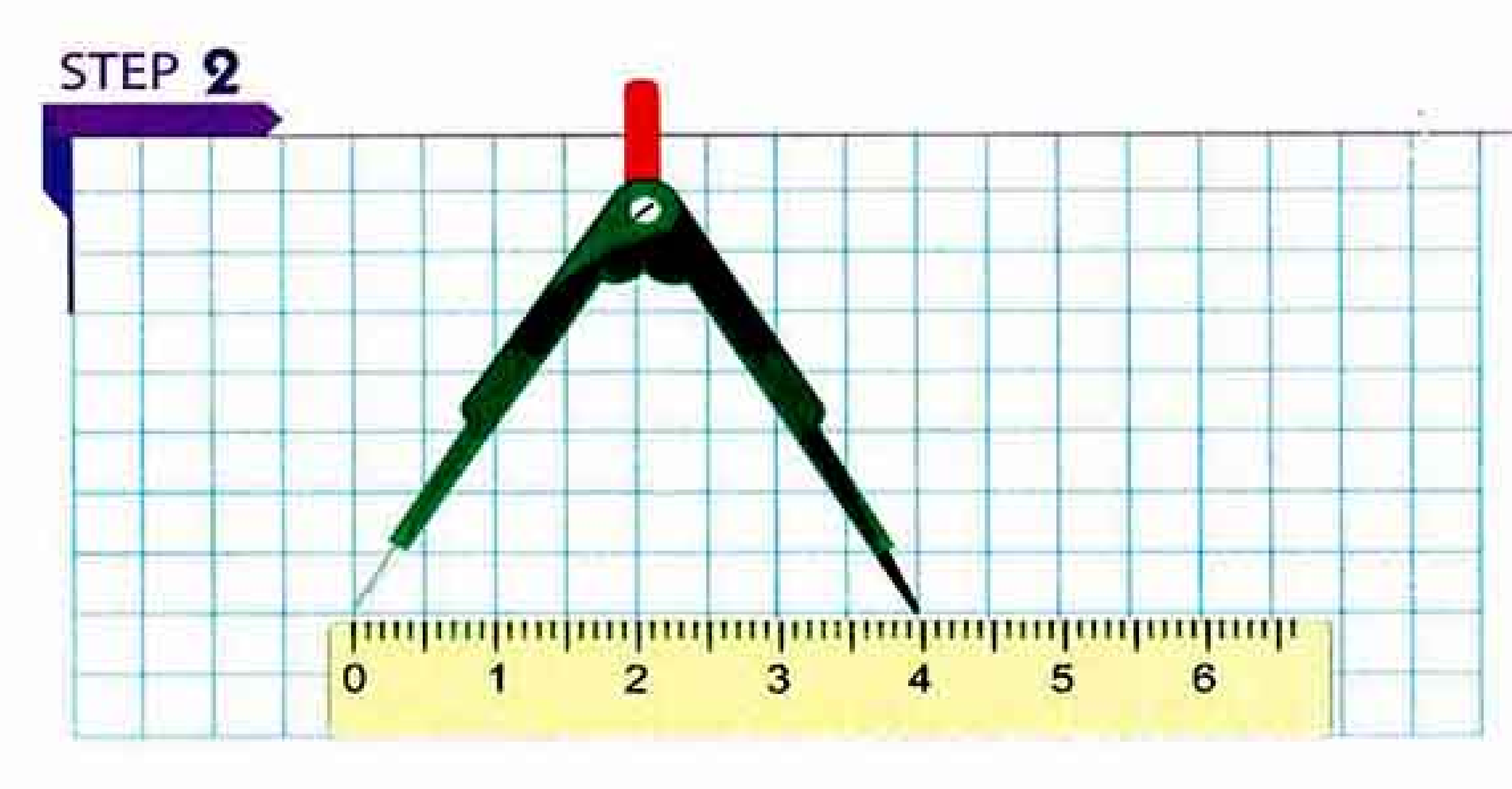
Solution

STEP 1



Use the ruler to draw the line segment $\overline{AB}$ of length 6 cm.

STEP 2

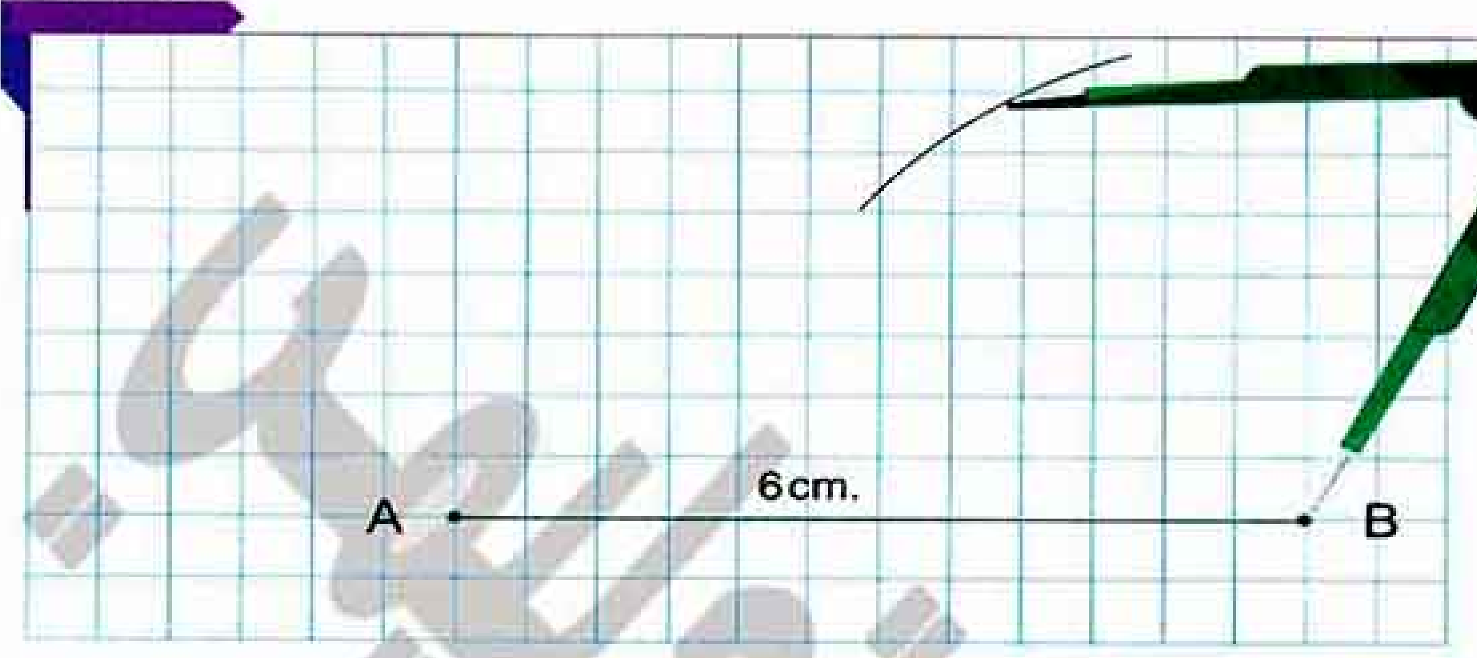


Open the compasses on the ruler such that the distance between the sharp point and the pencil equals 4 cm. to draw $\overline{BC}$





STEP 3

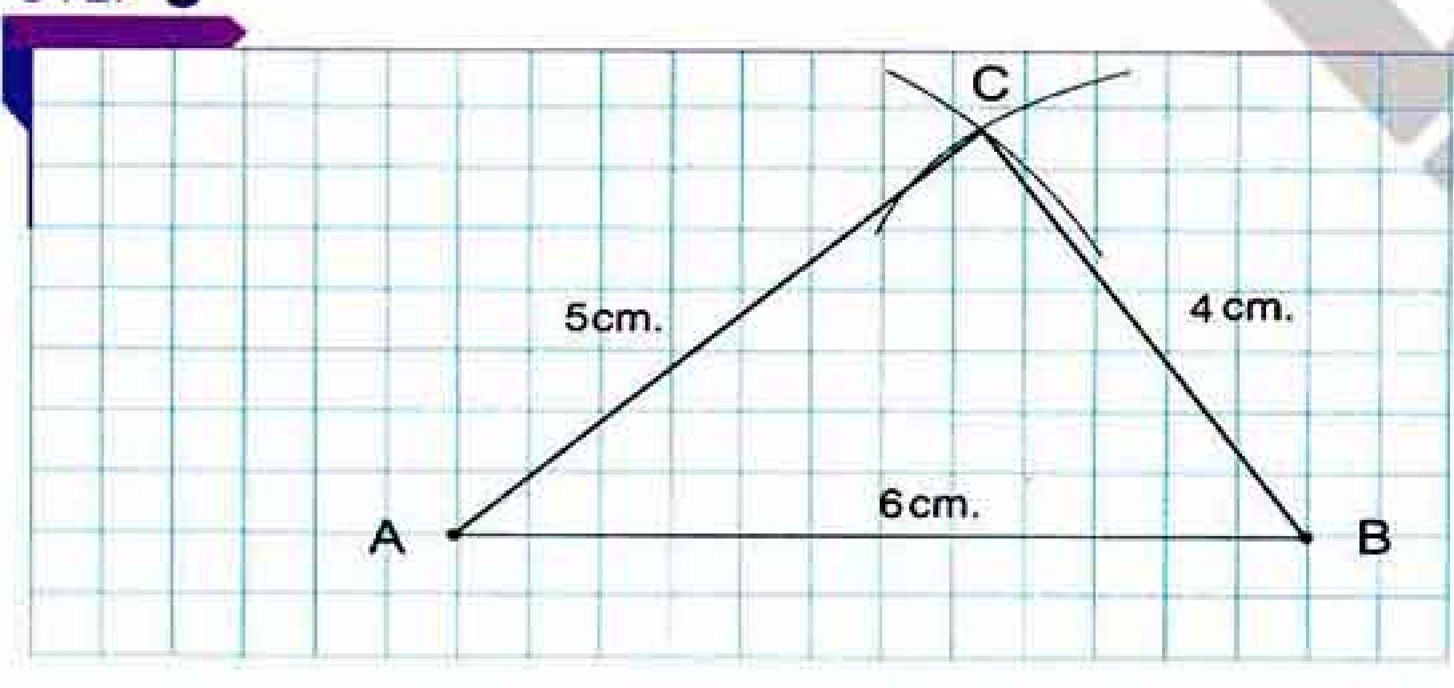


Place the sharp point at B and turn the compasses to draw an arc as in figure.

STEP 4

Similarly open the compasses to a distance equal to 5 cm. to draw $\overline{CA}$ and place the sharp point at A , then turn the compasses to draw another arc that intersects the first arc at the point C

STEP 5



Draw each of $\overline{BC}$ and $\overline{CA}$, then the triangle ABC is the required triangle.

Example 2

Draw the triangle XYZ in which XY = 4 cm. and YZ = ZX = 5 cm.

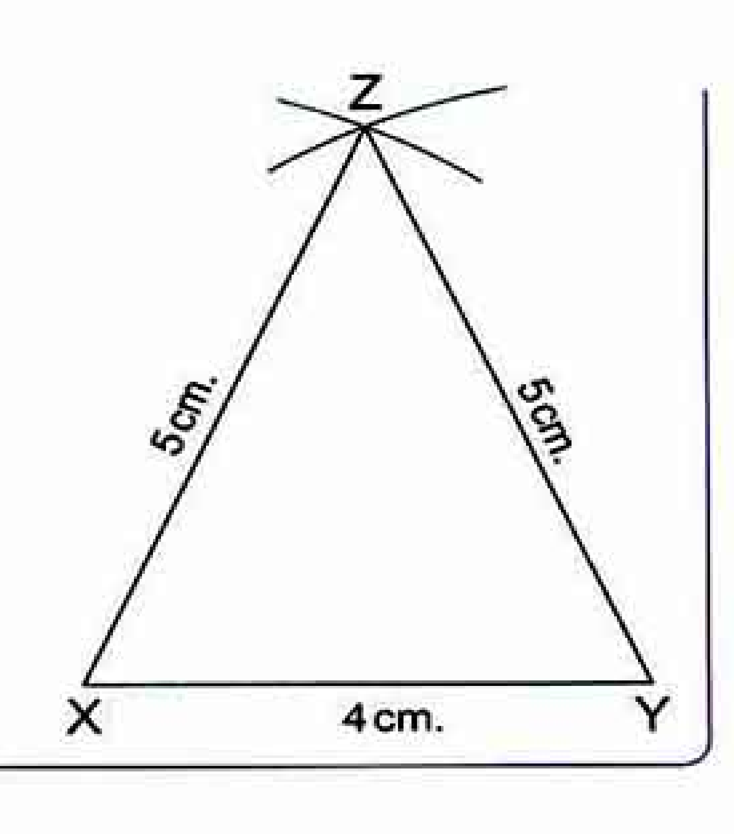
Solution

[1] Draw the line segment $\overline{XY}$ of length 4 cm.





[2] Open the compasses to a distance equal to 5 cm., then fix the sharp point at X and draw an arc.



[3] Using the same distance, fix the sharp point at Y and draw another arc that intersects the first arc at Z

[4] Draw $\overline{YZ}$ and $\overline{ZX}$ to get the triangle XYZ

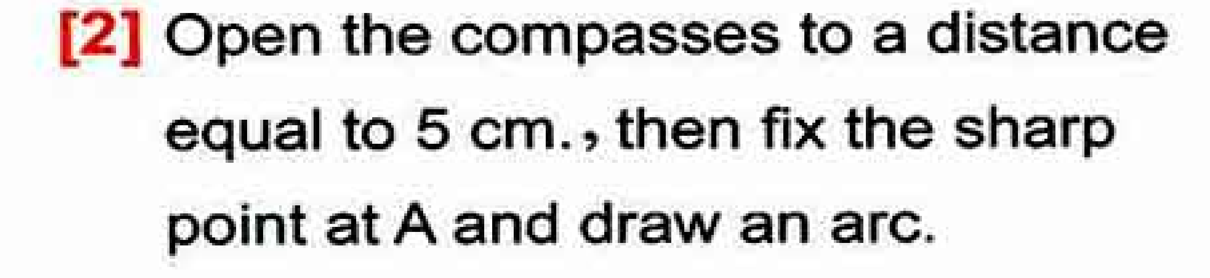
Example (3)

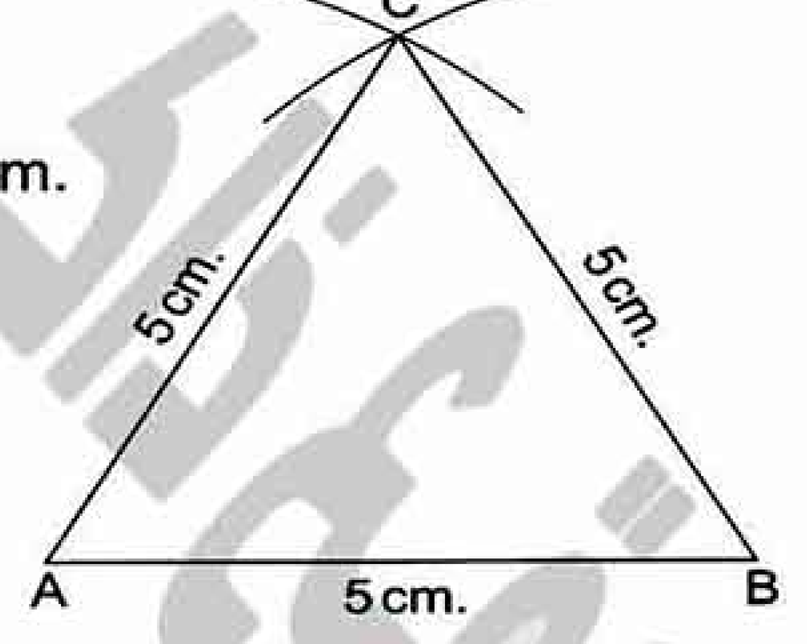
Draw the equilateral triangle ABC whose perimeter is 15 cm.
Find the measure of each of ∠ A, ∠ B and ∠ C, what do you notice?

Solution

- Since the perimeter of Δ ABC is 15 cm., then the length of each side is $\frac{15}{3} = 5$ cm.

[1] Draw the line segment $\overline{AB}$ of length 5 cm.





[2] Open the compasses to a distance equal to 5 cm., then fix the sharp point at A and draw an arc.

[3] Using the same distance, fix the sharp point at B and draw another arc that intersects the first arc at C

[4] Draw $\overline{BC}$ and $\overline{CA}$ to get the equilateral triangle ABC

- By measuring, we find that :

m (∠ A) = 60°, m (∠ B) = 60° and m (∠ C) = 60°

We notice that : m (∠ A) = m (∠ B) = m (∠C) = 60°





Remark

You can answer the questions by only drawing without writing the steps of solution.



- **Draw $\triangle$ XYZ in which XY = 3 cm. , YZ = 4 cm. and XZ = 5 cm. , then find the measure of $\angle$ Y**
- **Draw $\triangle$ ABC in which AB = BC = CA = 3.5 cm.**







Exercise 20 — Drawing a triangle given the lengths of its three sides

From the school book

Use your geometric instruments , do not remove the arcs :

1 Draw the triangle LMN in which : LM = 8 cm. , MN = 5 cm. and NL = 6 cm.

2 Draw the triangle XYZ in which : XY = YZ = 7 cm. and XZ = 4 cm.

3 Draw the triangle XYZ in which XY = YZ = ZX = 6 cm.
Find the measure of each of ∠ X , ∠ Y and ∠ Z What do you notice ?

4 Draw the isosceles triangle XYZ in which the length of the base = 4 cm. and the length of each of its two other sides = 6 cm.

5 Draw the equilateral triangle LMN whose perimeter is 9 cm.

6 Draw the triangle ABC in which AB = 4 cm. , BC = 3 cm. and AC = 5 cm. , what is the type of this triangle according to its angles ?

7 Draw the triangle XYZ in which XY = 10 cm. , YZ = 8 cm. and XZ = 6 cm. , then find the measure of the angle XZY , what do you notice?

8 Draw the triangle ABC in which AB = 7 cm. , BC = 3.5 cm. and AC = 4.5 cm.
Find the type of the triangle according to its side lengths.

9 Draw the triangle XYZ in which XY = 10.5 cm. , YZ = 8.5 cm. and XZ = 6.5 cm.
Find its perimeter.

10 Draw the triangle ABC where AB = AC = 5 cm. and BC = 6 cm. in which D is the midpoint of $\overline{BC}$, then draw $\overline{AD}$ and then find the measure of ∠ ADB and find the length of the line segment $\overline{AD}$

11 Draw a circle of a radius 2.5 cm. and draw $\overline{AB}$ as its diameter , then complete drawing the equilateral triangle ABC , then choose the correct answer :

a The point C is located .... the circle. (inside *or* outside *or* on)

b $\overline{AC}$ is .... (a chord *or* a radius *or* something else)





12 Draw the triangle ABC in which AB = 4 cm. , BC = 6 cm. and CA = 8 cm. Then draw a circle whose centre is B and its radius is equal to 4 cm. , then complete the following :

a The point A is located .... the circle.

b The point C is located .... the circle.

c .... is called the radius of the circle.

13 Draw the equilateral triangle ABC whose side length is equal to 4 cm., then draw a circle whose centre is A and radius is equal to 4 cm. , then complete the following :

a $\overline{AB}$ is called .... in the circle.

b $\overline{AC}$ is called .... in the circle.

c $\overline{BC}$ is called .... in the circle.

14 Draw the triangle ABC in which AB = 6 cm. , BC = 8 cm. and AC = 10 cm., then draw circle M with diameter $\overline{AC}$, then find :

a The perimeter of the triangle ABC

b The measure of ∠ ABC

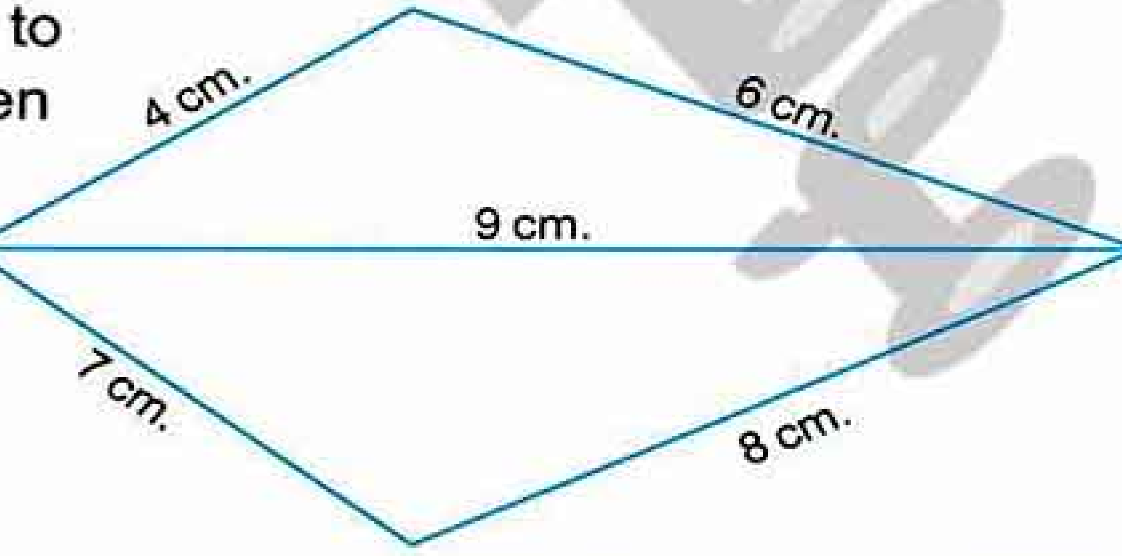
c The length of $\overline{AM}$, $\overline{BM}$ and $\overline{CM}$, what do you notice ?

d The type of the triangle MBC according to the measures of its angles.

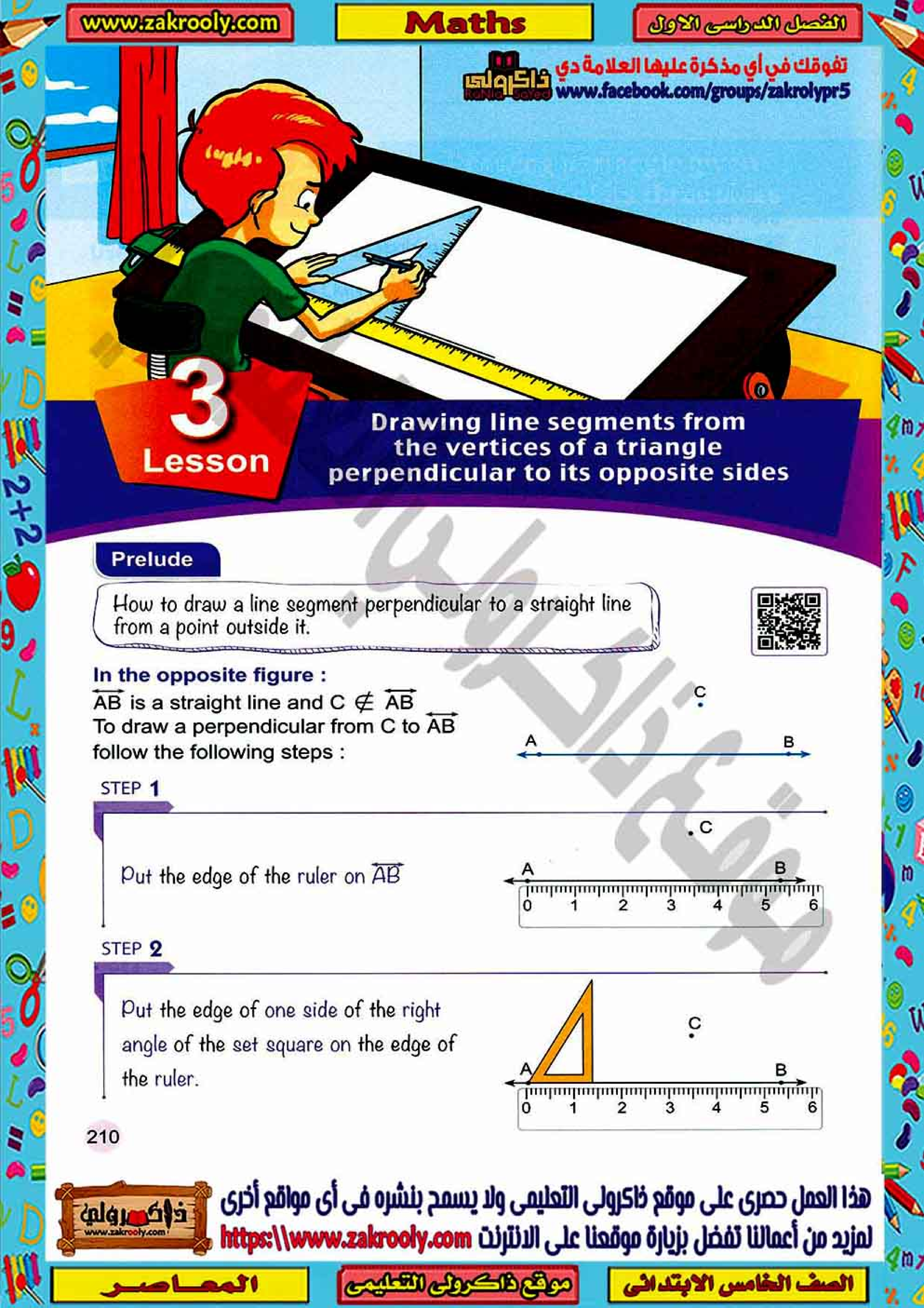
e Two isosceles triangles.

Challenge

15 The following figure is not drawn to scale , draw it respecting the given measures :



16 Try to draw a triangle of side lengths 2 cm. , 4 cm. and 7 cm. What can you deduce ?



3 Lesson — Drawing line segments from the vertices of a triangle perpendicular to its opposite sides

Prelude

How to draw a line segment perpendicular to a straight line from a point outside it.

In the opposite figure :

$\overleftrightarrow{AB}$ is a straight line and $C \notin \overleftrightarrow{AB}$

To draw a perpendicular from C to $\overleftrightarrow{AB}$ follow the following steps :

STEP 1

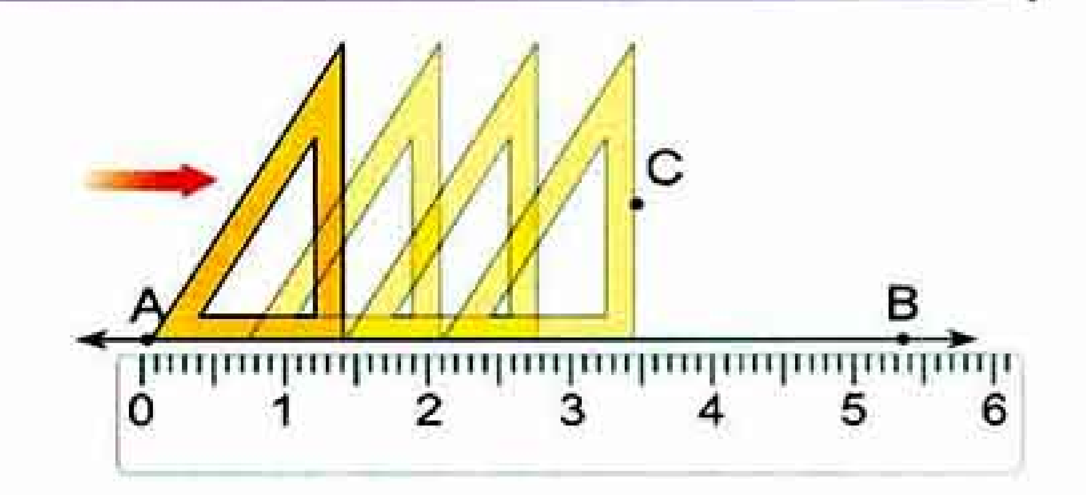
Put the edge of the ruler on $\overleftrightarrow{AB}$

STEP 2

Put the edge of one side of the right angle of the set square on the edge of the ruler.

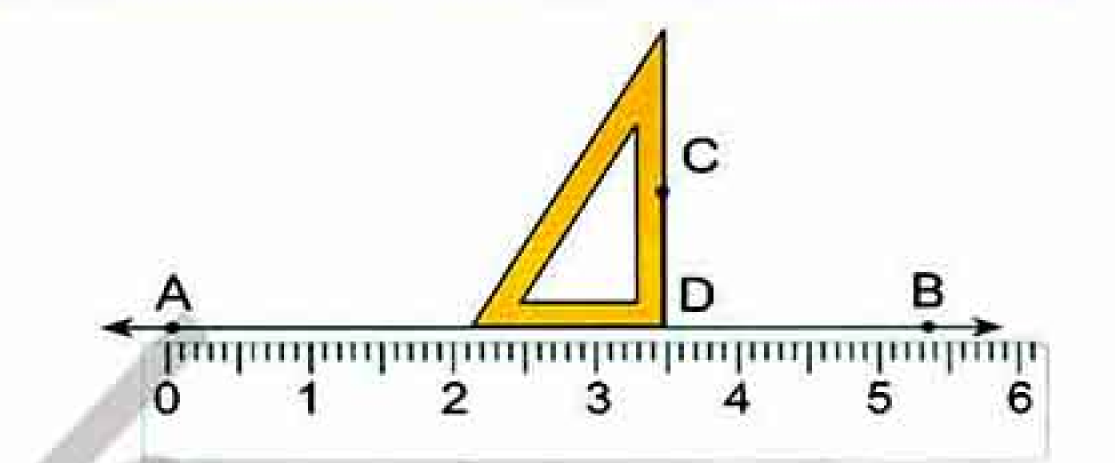
STEP 3

Move the set square in the direction of the arrow as in the opposite figure to slide along the edge of the ruler till it reaches the point C



STEP 4

From C draw a line segment intersects $\overleftrightarrow{AB}$ at D , then $\overleftrightarrow{CD} \perp \overleftrightarrow{AB}$

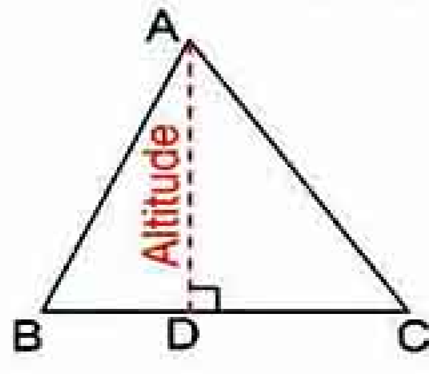


The altitudes of a triangle

An altitude of a triangle is a line segment drawn from a vertex of the triangle perpendicular to its corresponding base , or to its corresponding base extended.

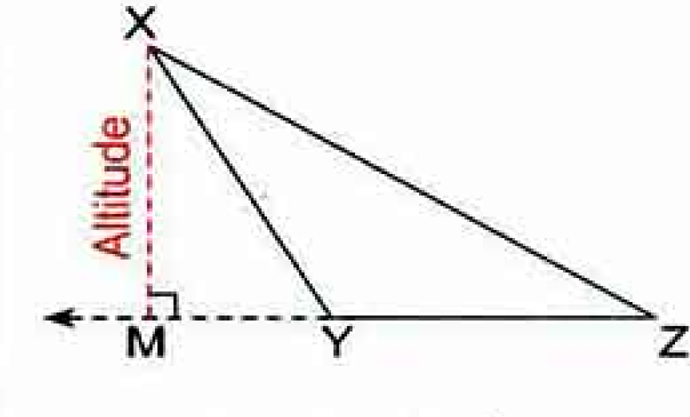
For Example :

In the following figures :



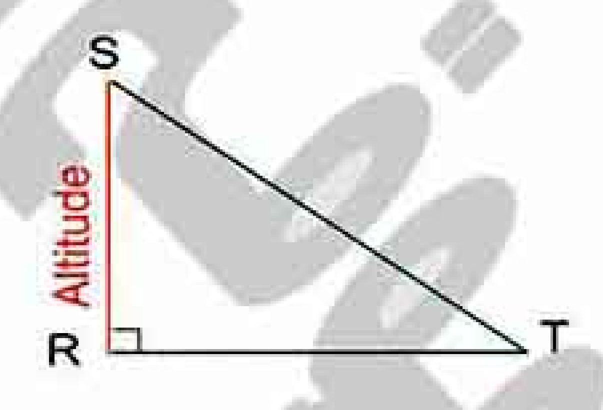
$\overline{AD} \perp \overline{BC}$

So, $\overline{AD}$ is an altitude of Δ ABC corresponding to the base $\overline{BC}$



$\overline{XM} \perp \overrightarrow{ZY}$

So, $\overline{XM}$ is an altitude of Δ XYZ corresponding to the base $\overline{YZ}$



$\overline{SR} \perp \overline{RT}$

So, $\overline{SR}$ is an altitude of Δ SRT corresponding to the base $\overline{RT}$

Note that :

The length of the altitude of the triangle is called **the height of the triangle.**

Drawing the altitudes of a triangle

Any side of a triangle can be considered as a base of the triangle.

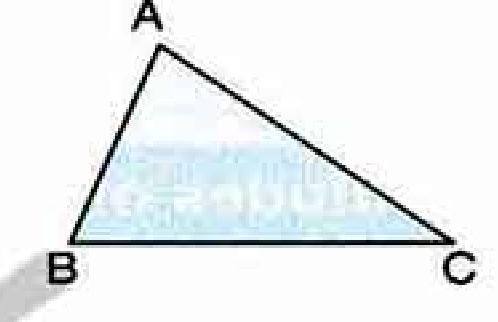
i.e. any triangle has 3 bases , so it also has 3 altitudes.

In this lesson, we will learn how to draw the altitudes of the triangle.

First The altitudes of an acute-angled triangle

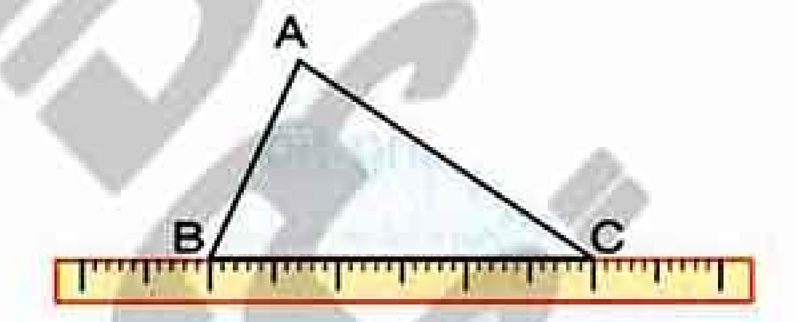
STEP 1

Draw the acute-angled triangle ABC



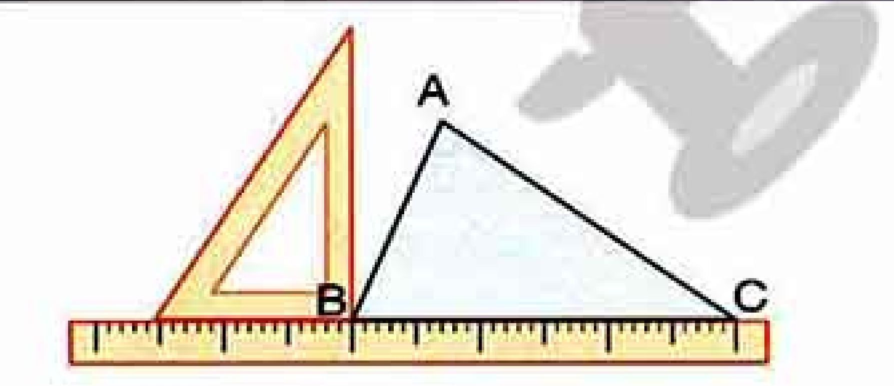
STEP 2

Put the edge of the ruler on one side of the triangle like $(\overline{BC})$



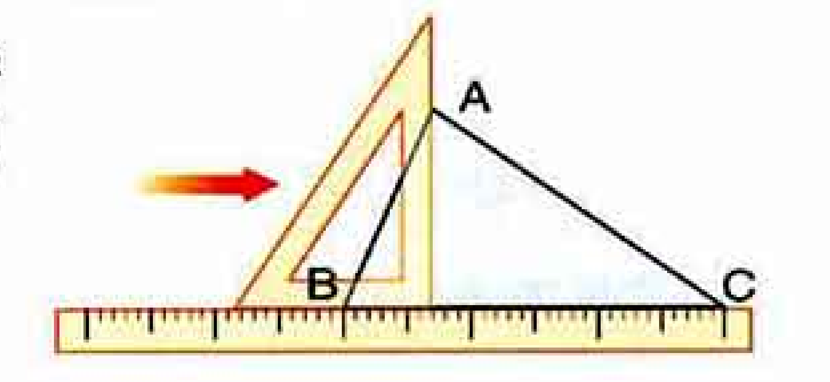
STEP 3

Put the edge of one side of the right angle of a set square on the edge of the ruler.



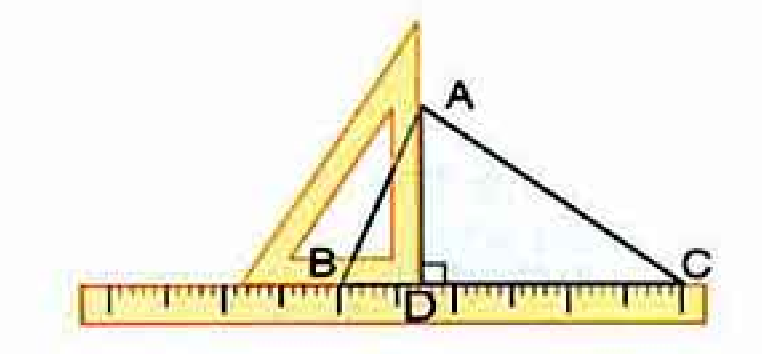
STEP 4

Move the set square as shown in the opposite figure to slide along the edge of the ruler until the point A to coincide with the edge of the set square.



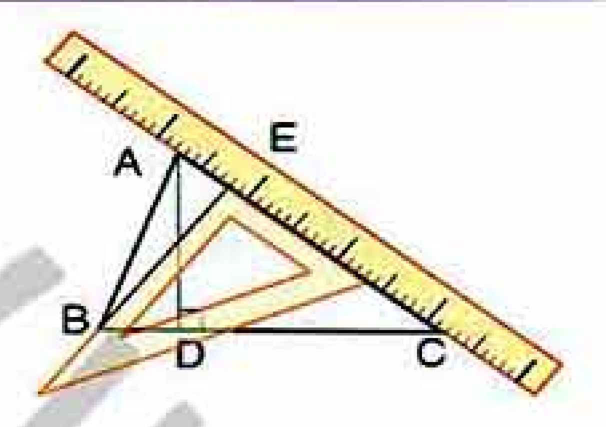
STEP 5

Draw the line segment $\overline{AD}$, so $\overline{AD}$ is perpendicular to $\overline{BC}$ and the line segment $\overline{AD}$ is the altitude of the triangle.



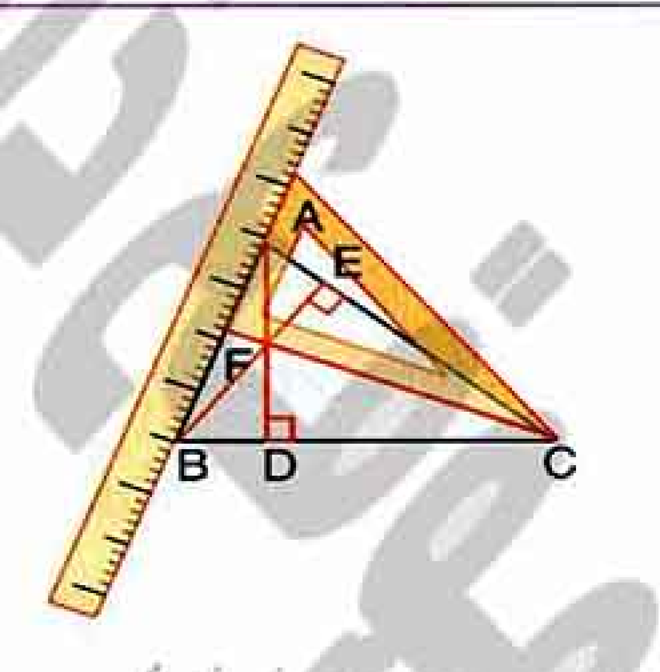
STEP 6

Put the edge of the ruler on another side ($\overline{AC}$) and repeat the steps from (3) to (5), then draw the perpendicular line segment $\overline{BE}$ to $\overline{AC}$

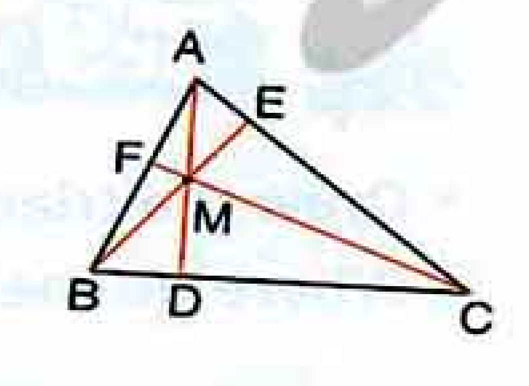


STEP 7

Put the edge of the ruler on the third side ($\overline{AB}$) and repeat the steps from (3) to (5), then draw the perpendicular line segment $\overline{CF}$ to $\overline{AB}$



i.e. The three altitudes $\overline{AD}$, $\overline{BE}$ and $\overline{CF}$ intersect at one point (M) located inside the triangle.

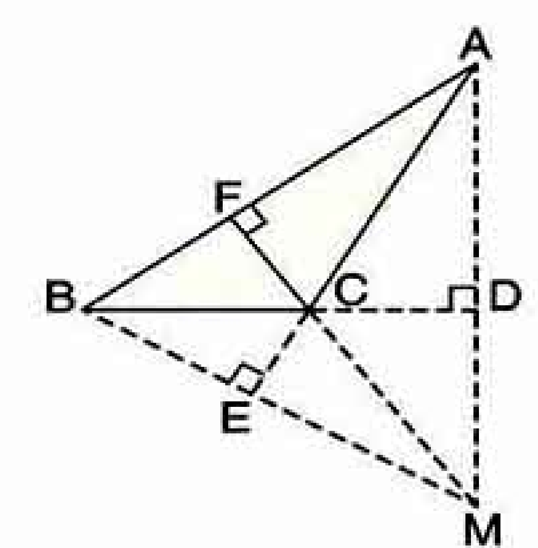


Second The altitudes of an obtuse-angled triangle

When we use the previous steps in the first case , we deduce that :

The perpendicular from the vertex A cuts $\overrightarrow{BC}$ at D (outside the triangle)

So , the three altitudes of the triangle **ABC** are :



$\overline{AD}$, its corresponding base is $\overline{BC}$ (where $\overline{AD} \perp \overrightarrow{BC}$)

$\overline{BE}$, its corresponding base is $\overline{AC}$ (where $\overline{BE} \perp \overrightarrow{AC}$)

$\overline{CF}$, its corresponding base is $\overline{AB}$ (where $\overline{CF} \perp \overline{AB}$)

i.e. The three rays $\overrightarrow{AD}$, $\overrightarrow{BE}$ and $\overrightarrow{FC}$ intersect at one point (M) located outside the triangle.

Third The altitudes of a right-angled triangle

When we notice the right-angled triangle , we deduce that :

$\overline{AB}$ and $\overline{CB}$ are two perpendicular line segments of the triangle.

The third perpendicular line segment can be drawn from B perpendicular to $\overline{AC}$ which is $\overline{BD}$

So , the three altitudes of the triangle **ABC** are :

$\overline{AB}$, its corresponding base is $\overline{BC}$

$\overline{CB}$, its corresponding base is $\overline{AB}$

$\overline{BD}$, its corresponding base is $\overline{AC}$

i.e. The three altitudes $\overline{AB}$, $\overline{CB}$ and $\overline{BD}$ intersect at the point B which is the vertex of the right angle.

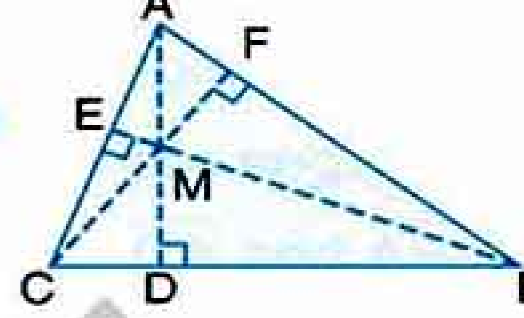


- **Draw the triangle XYZ such that XY = YZ = ZX = 7 cm. Where do the altitudes meet ?**

Summary

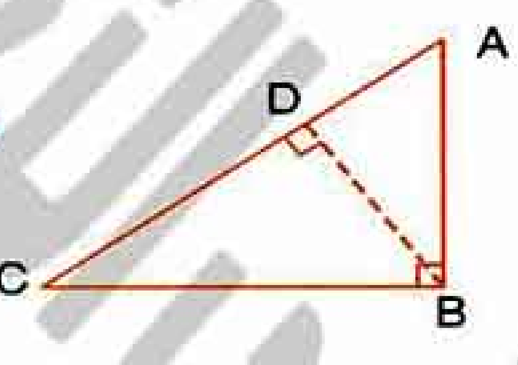
From the previous cases , we get :

- The altitudes of **an acute-angled triangle**



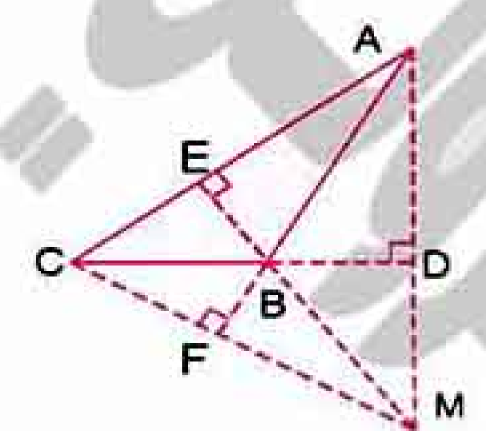
$\overline{AD}$, $\overline{BE}$ and $\overline{CF}$ are the altitudes of Δ ABC
They intersect at one point (M) **inside** the triangle.

- The altitudes of **a right-angled triangle**



$\overline{AB}$, $\overline{BC}$ and $\overline{BD}$ are the altitudes of Δ ABC
They intersect at one point (B) which is **the vertex of the right angle.**

- The altitudes of **an obtuse-angled triangle**



$\overline{AD}$, $\overline{BE}$ and $\overline{CF}$ are the altitudes of Δ ABC

Notice

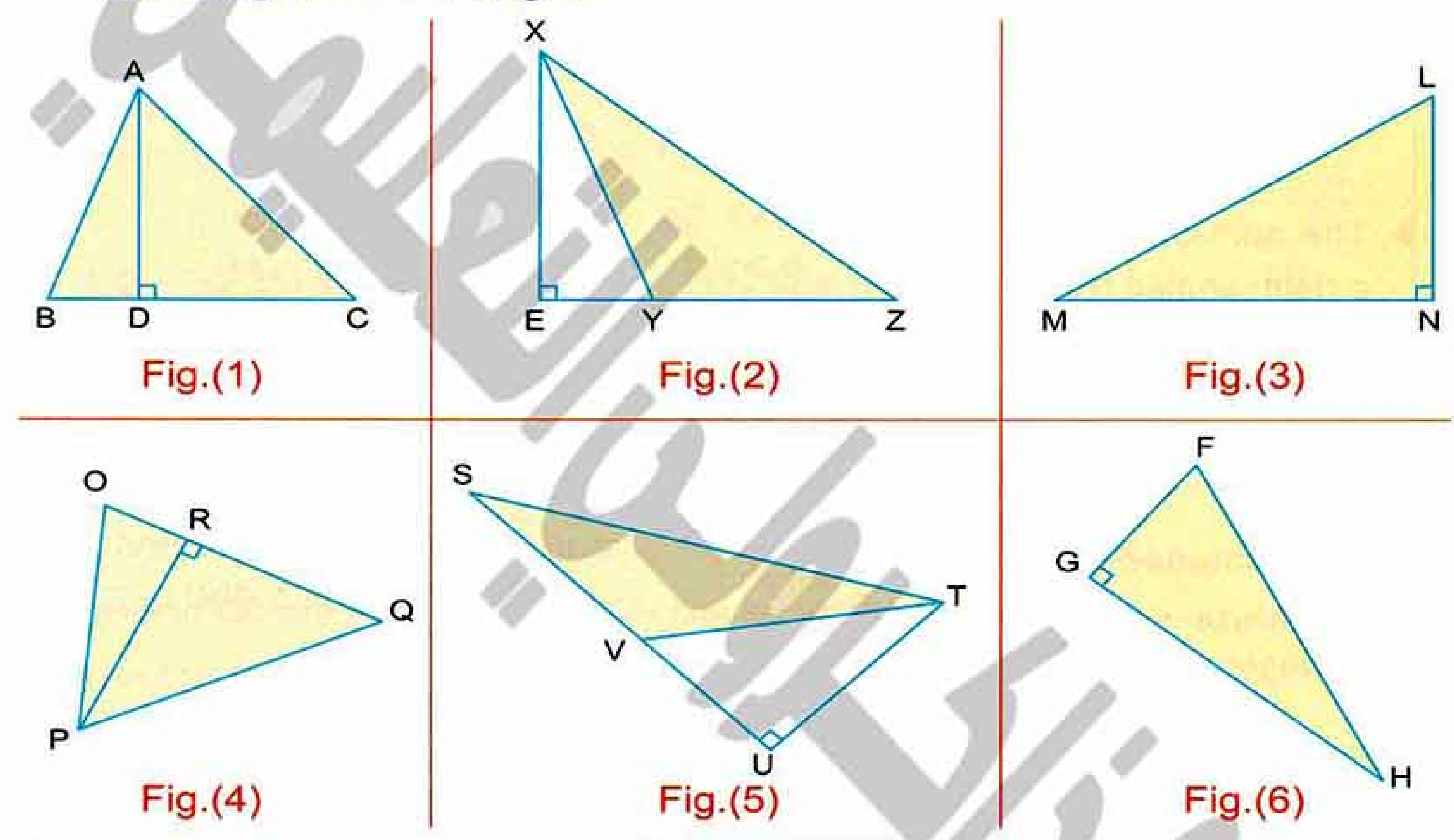
$\overleftrightarrow{AD}$ and $\overleftrightarrow{CF}$ lie outside Δ ABC and the three altitudes intersect at one point (M) outside the triangle.

Exercise 21

Drawing line segments from the vertices of a triangle perpendicular to its opposite sides

From the school book

1 **Mention one altitude and its corresponding base in each of the following shaded triangles :**



2 Draw the triangle LMN in which LM = 4 cm., MN = 5 cm. and NL = 6 cm., then draw a perpendicular from L to $\overline{MN}$ that intersects it at X, also draw a perpendicular from M to $\overline{LN}$ that intersects it at Y, then measure the lengths of $\overline{LX}$, $\overline{MY}$

3 Draw the triangle ABC in which AB = 7 cm., BC = CA = 6 cm., then draw the line segment from point C that is perpendicular to $\overline{AB}$ and find its length.

4 Draw the triangle XYZ in which XY = 3 cm., YZ = 5 cm. and ZX = 7 cm. Determine the type of the triangle according to the measures of its angles, then draw the perpendicular segment from X to $\overleftrightarrow{YZ}$ and measure its length.

5 Draw the triangle ABC in which AB = AC = 8 cm. and BC = 6 cm. Draw its three altitudes , then find the length of each one of them (the heights) What do you notice ?

6 Draw the equilateral triangle ABC whose side is equal to 6 cm. , then from its vertices, draw the segments $\overline{AD}$, $\overline{BE}$ and $\overline{CF}$ perpendicular to the opposite sides : $\overline{BC}$, $\overline{CA}$ and $\overline{AB}$ respectively, then measure the lengths of $\overline{AD}$, $\overline{BE}$ and $\overline{CF}$ What do you observe ?

7 Draw the triangle ABC where AB = 7.5 cm. , BC = 10 cm. and CA = 8 cm. Draw the altitude from A to $\overline{BC}$ and measure its length.

8 Draw $\triangle$ ABC in which AB = 9.8 cm. , BC = 7 cm. and AC = 5 cm. Draw the altitudes of this triangle.

9 Draw the triangle ABC in which AB = BC = 7.5 cm. and AC = 4 cm. Draw the altitudes of $\triangle$ ABC , then measure their lengths.

10 Draw the triangle ABC in which AB = 5 cm. , BC = 6 cm. and m ($\angle$ B) = 120°, then draw $\overline{AD}$ perpendicular to $\overleftrightarrow{BC}$, and measure the length of $\overline{AD}$ Draw also $\overline{BE}$ perpendicular to $\overleftrightarrow{AC}$ and measure the length of $\overline{BE}$ Are $\overleftrightarrow{AD}$ and $\overleftrightarrow{BE}$ intersected at one point ?

11 Draw the triangle XYZ in which XY = 7 cm. and m ($\angle$ X) = m ($\angle$ Y) = 60°, draw the perpendicular line segment $\overline{ZA}$ to cut $\overline{XY}$ at A , then measure its length.

12 Draw the triangle ABC in which AB = 6 cm. , AC = 8 cm. and m ($\angle$ BAC) = 90° From point A , draw the altitude $\overline{AD}$ of the triangle ABC , then find the length of $\overline{AD}$ (the height)

13 Draw the equilateral triangle ABC whose perimeter is 18 cm. , then draw the three altitudes of this triangle. What do you notice ?



14 📖 Draw the isosceles triangle ABC whose right angle is B and in which AB = 5 cm., then draw the line segment $\overline{DB}$ from point B perpendicular to $\overline{AC}$ and find the length of that line segment.

15 📖 Draw a circle whose center is M and radius is equal to 4 cm. Draw the diameter $\overline{AB}$ and label the point C $\in$ the circle M, then draw the triangle ABC and the line segments from its vertices and perpendicular to the opposite sides of the triangle ABC, then label the point of intersection for these line segments.

16 📖 Draw a circle M whose radius is equal to 3.5 cm. , then draw its diameter $\overline{AB}$ and label any point C $\in$ the circle. Draw the triangle ABC and draw $\overline{CD} \perp \overline{AB}$ where D $\in \overline{AB}$, find the length of $\overline{CD}$?

17 📖 Draw a circle whose center is N and diameter is 6 cm. Then, draw the diameter $\overline{AB}$ and the chord $\overline{AC}$ in the circle. Draw $\overline{BC}$. Use the protractor to measure $\angle$ ACB , then draw $\overrightarrow{CD} \perp \overline{AB}$ that intersects it at D and the circle at E, then choose the correct answer :

a The triangle ABC is .... triangle.
(right-angled *or* acute-angled *or* obtuse-angled)

b $\overline{CE}$ is .... in the circle. (chord *or* diameter *or* radius)

c The intersection point of the perpendicular line segments drawn from the vertices of the triangle ABC to the opposite sides is ....
(C *or* D *or* E)

18 Draw the line segment $\overline{BC}$ where BC = 5 cm. D is the midpoint of $\overline{BC}$ Draw $\overline{DA}$ perpendicular to $\overline{BC}$ where DA = 6 cm. Measure the length of each of $\overline{AB}$ and $\overline{AC}$ What do you notice ?

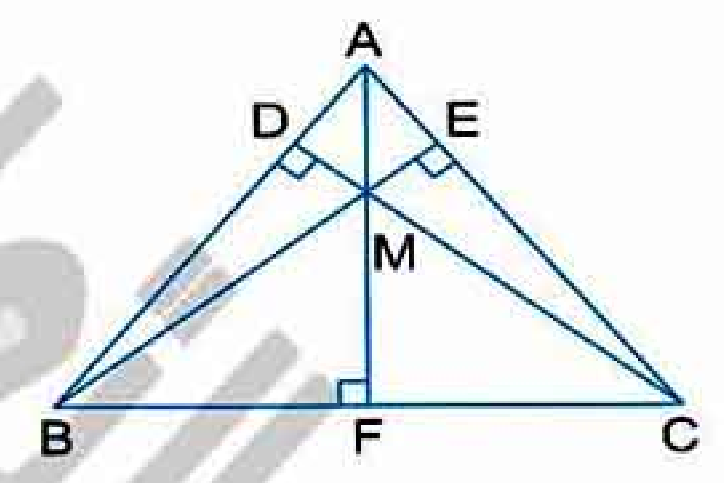
19 📖 Draw the rectangle ABCD in which AB = 3 cm. , BC = 5 cm. , then label the point X $\in \overrightarrow{DA}$ where AX = 2 cm. How many locations can be labeled for the point X on the ray $\overrightarrow{DA}$. Draw the triangle XBC , then draw $\overline{XY}$ perpendicular from X to $\overleftrightarrow{BC}$
Can you know the length of $\overline{XY}$ without measuring it by a ruler ?





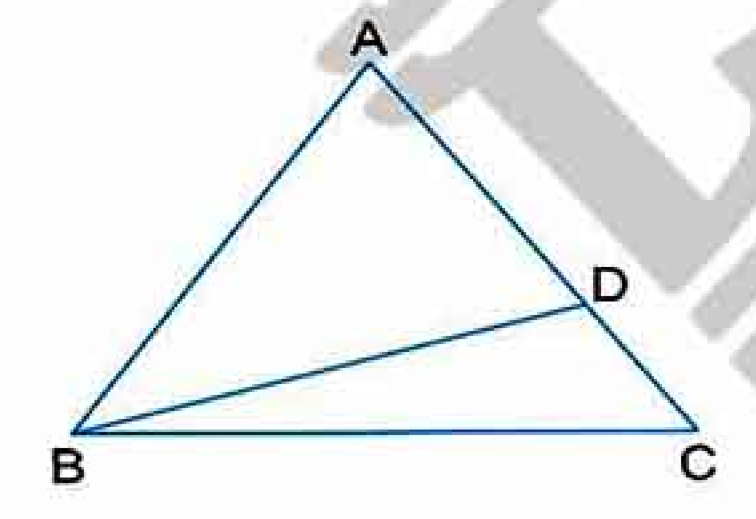
Challenge

20 According to the figure , complete the table :



The triangle	Δ ABC	Δ AMB	Δ AMC	Δ MBC
Its altitudes				

21 Draw a common altitude of the two triangles ABD and BDC :





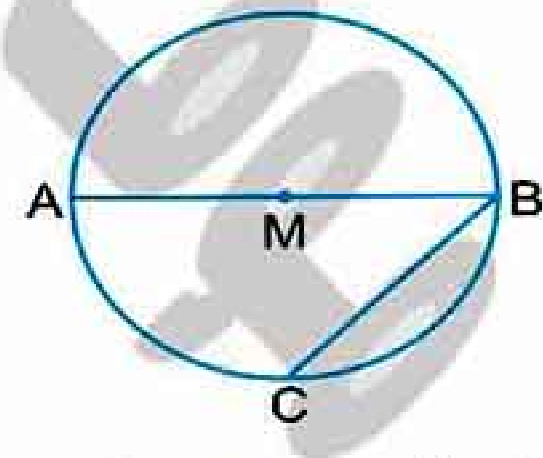
Test on unit three



Answer the following questions :

1 Choose the correct answer from the given ones :

1. Every triangle has .... altitudes. (1 *or* 2 *or* 3 *or* 4)
2. The longest chord in the circle is called ....
   (diameter *or* radius *or* side)
3. ABC is an equilateral triangle of side length 5 cm. ,
   then its perimeter = ... cm. (10 *or* 25 *or* 15 *or* 20)
4. The altitudes of the obtuse-angled triangle intersect at one point
   located .... the triangle. (on *or* inside *or* outside)
5. If the length of the radius of a circle is 5 cm. , then the length of the
   longest chord = ... cm. (2 *or* 8 *or* 6 *or* 10)
6. The triangle which the measures of its angles are 50° , 90° and 40°
   is called .... -angled triangle. (acute *or* right *or* obtuse)
7. The midpoint of any diameter in a circle is .... of the circle.
   (chord *or* radius *or* diameter *or* centre)
8. **In the opposite figure :**
   $\overline{BC}$ is a .... in the circle

   (radius *or* chord *or* diameter *or* centre)
9. The triangle whose side lengths are different in length is
   called .... triangle. (equilateral *or* isosceles *or* scalene)





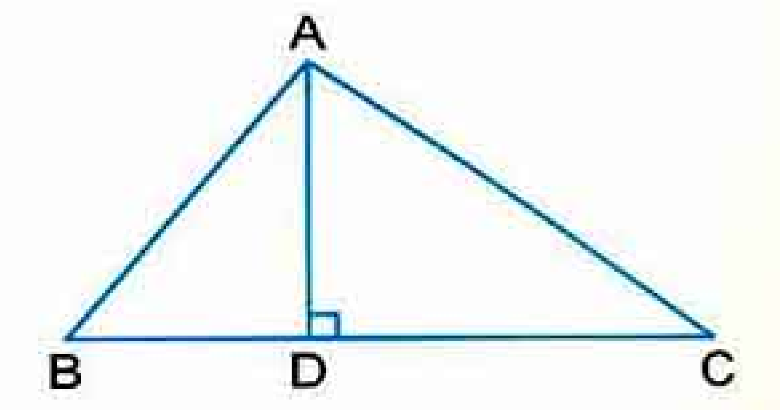
10 If M is a circle whose diameter length is 6 cm. and MA = 4 cm. , then the point A is located .... the circle.

(inside *or* on *or* outside)

11 Any line segment connects between any two points on the circle is called .... (diameter *or* radius *or* chord *or* centre)



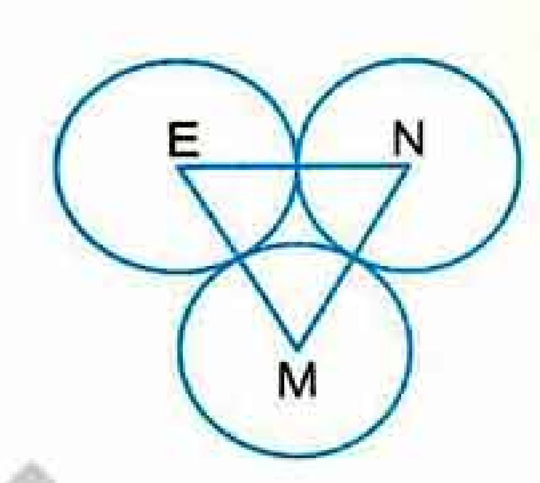
12 In the oposite figure :



.... is an altitude of the triangle ABC

($\overline{AB}$ *or* $\overline{CA}$ *or* $\overline{AD}$ *or* $\overline{BC}$)

13 In the opposite figure :



Three circles of centres M , N and E of radius length 4 cm. for each , then the perimeter of $\triangle$ MEN = ... cm.

(12 *or* 16 *or* 24 *or* 36)

14 In a circle M of diameter length 12 cm. , if MX = 5 cm. , then MX .... the radius length of the circle M

(< *or* = *or* >)

2 Complete each of the following :

15 The chord of the circle which passes through its centre is ....

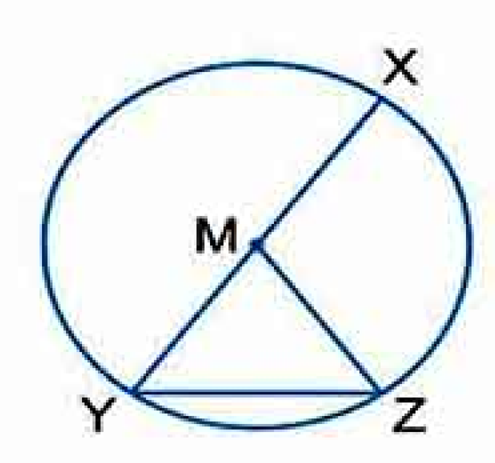
16 The altitudes of the right-angled triangle intersect at ....

17 All radii of the same circle are ....

18 To draw a circle of diameter length 12 cm. , then the opening distance of the compasses should be ....

19 The number of altitudes in the right-angled triangle is ....





20 **From the opposite figure :**

[a] .... is called a diameter in the circle M

[b] Each of $\overline{XM}$, $\overline{YM}$ and $\overline{ZM}$

is called .... in the circle M

21 The length of the altitude of the triangle is called the .... of the triangle.

22 If X and Y belong to the circle M where $M \in \overline{XY}$, then $\overline{XY}$ is called a .... in the circle.

3 Answer the following :

23 Draw a circle M with radius length 4 cm.

24 Draw the triangle ABC in which AB = 8 cm. ,

BC = 6 cm. and AC = 10 cm.

then find by measuring m (∠ B)

25 Draw a circle whose centre is M and

its diameter AB = 10 cm. , then draw chord $\overline{BC}$

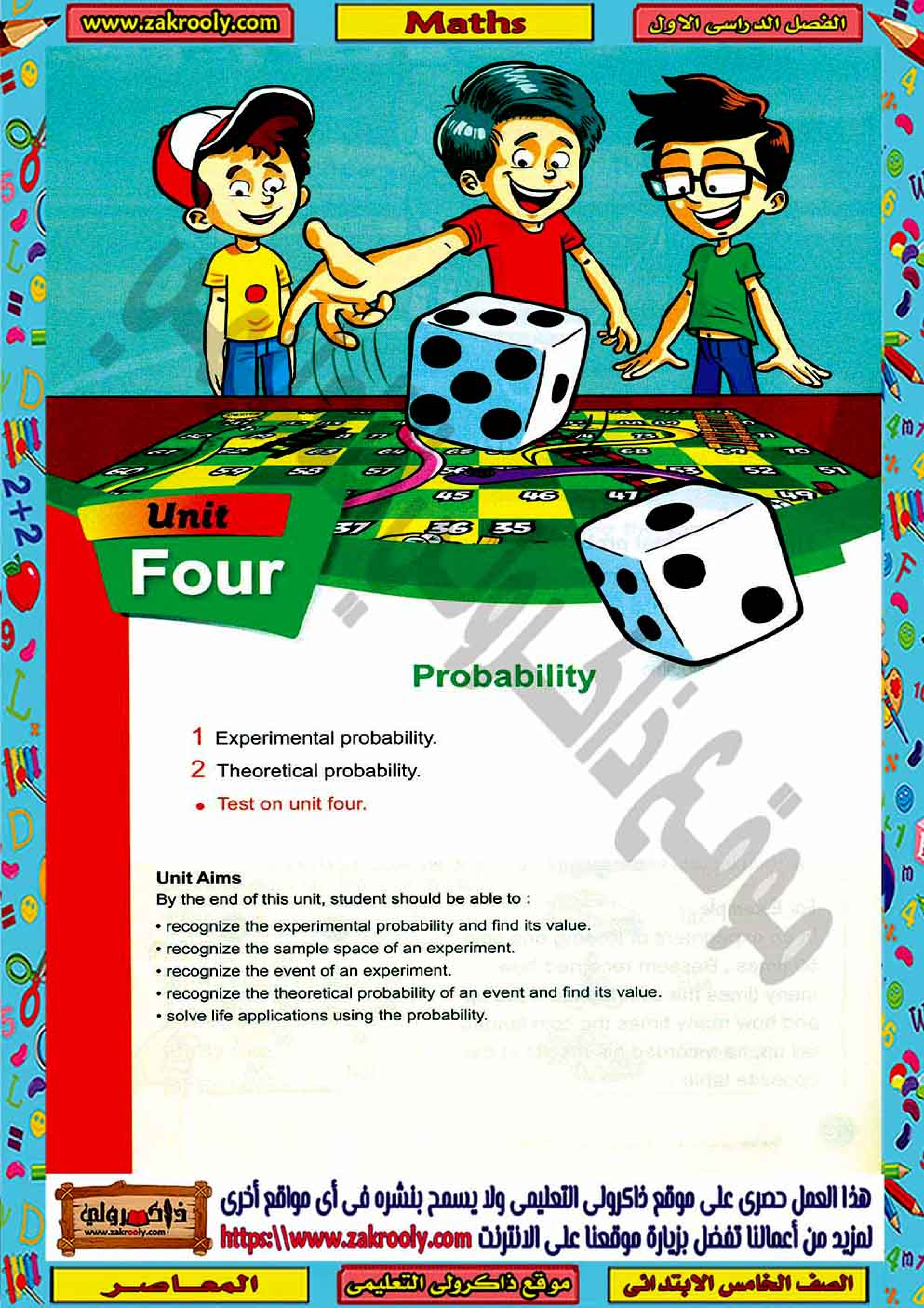
with length 8 cm. (Don't remove the arcs)

Find : **[a]** Length of $\overline{AC}$ **[b]** m (∠ C)

26 Draw the triangle ABC in which

BC = 6 cm. and AC = AB = 5 cm.

Draw $\overline{AD} \perp \overline{BC}$, then find the length of $\overline{AD}$



Unit Four

Probability

Unit Aims

By the end of this unit, student should be able to :

- recognize the experimental probability and find its value.
- recognize the sample space of an experiment.
- recognize the event of an experiment.
- recognize the theoretical probability of an event and find its value.
- solve life applications using the probability.

1 Lesson Experimental probability

The experimental probability depends on :

- Performing an experiment.
- Then we record the results.
- And use them to calculate the value of probability of an event occurrence using the following rule :

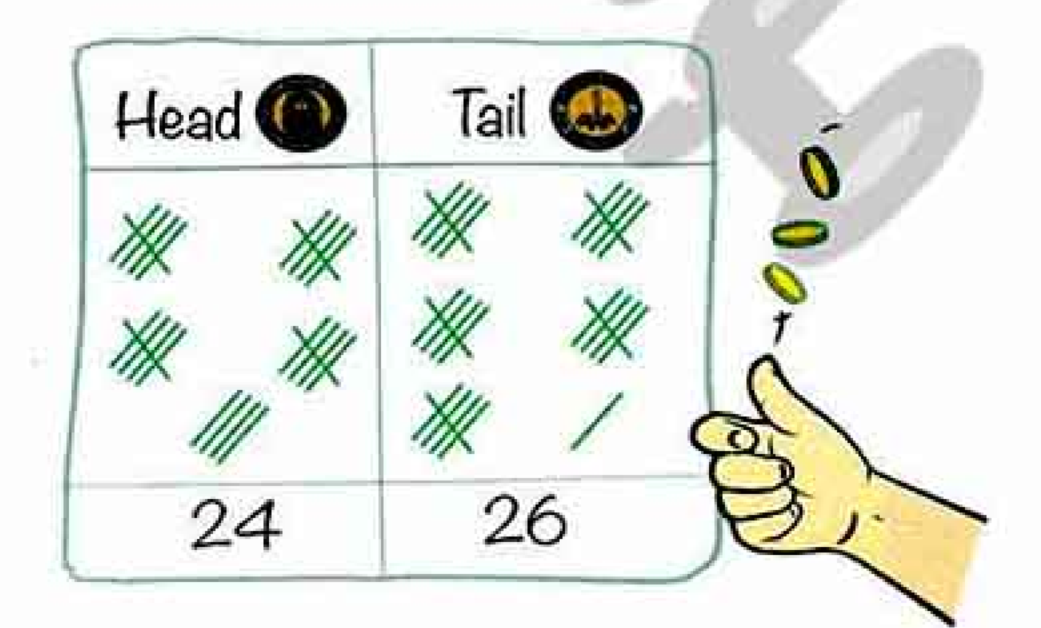
Rule

$$\text{Experimental probability} = \frac{\text{Number of trials in which the outcome occurs}}{\text{Total number of trials}}$$

- From the results of the experimental probability , we can predict what may happen (occur) in the future referring to previous experience.

For Example :

In an experiment of tossing one coin 50 times , Bassem recorded how many times the coin landed head up and how many times the coin landed tail up, he recorded his results in the opposite table :



From the result of Bassem's experiment :

The experimental probability of getting a head $= \frac{\text{number of heads}}{\text{number of tosses}} = \frac{24}{50} = 0.48$



The experimental probability of getting a tail $= \frac{\text{number of tails}}{\text{number of tosses}} = \frac{26}{50} = 0.52$



- If you try to **toss the same coin 100 times , 200 times** and **record your results** , you will find that :

Increasing the number of tossing a coin tells the fact that the number of occurrence of heads is nearly equal to the number of occurrence of tails.

- From the results of Bassem's experiment , we can predict the number of occurrence of heads and tails when **tossing the same coin 1000 times** as follows :

  - The prediction about the number of occurrence of heads is $0.48 \times 1000 = 480$ times.
  - The prediction about the number of occurrence of tails is $0.52 \times 1000 = 520$ times.

Example

The opposite table shows the result of a survey of asking 60 students about how the student comes to school.

On foot	10
Public transport	15
Taxi	20
Bike	5
Private car	10

(1) What is the experimental probability of choosing a student coming to school :

[a] On foot.

[b] By public transport.

[c] By taxi.

[d] By bike.

[e] By private car.





② If the number of students in the school is 600 students , how can you predict about the number of students coming to the school by taxi ?

Solution

① [a] The experimental probability of choosing a student comes to school on foot is $\frac{10}{60} = \frac{1}{6}$

[b] The experimental probability of choosing a student comes to school by public transport is $\frac{15}{60} = \frac{1}{4}$

[c] The experimental probability of choosing a student comes to school by taxi is $\frac{20}{60} = \frac{1}{3}$

[d] The experimental probability of choosing a student comes to school by bike is $\frac{5}{60} = \frac{1}{12}$

[e] The experimental probability of choosing a student comes to school by private car is $\frac{10}{60} = \frac{1}{6}$

② The prediction about the number of students coming to the school by taxi = $600 \times \frac{1}{3}$ = 200 students.



- **A survey was applied to ask 24 students about the subject they prefer to study.**

The following table lists their answers :

Subject	Arabic	English	Maths	Science	Social studies
Number of students	4	4	8	6	2

If the total number of students in the school is 900 students.

[a] How many students are predicted to prefer studying maths ?

[b] How many students are predicted to prefer studying science ?






Exercise 22

Experimental probability

From the school book

1 📖 **The opposite table shows the result of a survey of asking 40 students about their favorite breakfast :**

Breakfast	
Foul and tamayia	20
Pie	4
Cheese and dessert	16

a What is the probability of choosing foul and tamayia ?

b What is the probability of choosing pies ?

c What is the probability of choosing cheese and dessert ?

d If the number of students is 400 students.

How can you predict about the number of students choosing foul and tamayia ?

2 **A survey has been applied on 100 students about their favourite games which they practise. The result was as follows :**

Favourite game	Football	Handball	Athletics	Tennis	Hockey
Number of students	44	27	12	4	13

a Find the probability if a student prefers :

(1) Practising football.

(2) Practising handball.

(3) Practising athletics.

(4) Practising tennis.

(5) Practising hockey.

b If the number of students is 600 , how many students are predicted to practise hockey ?



3 **The following table shows a sample formed from 200 TV viewers of TV programs :**

Program	Sports	News	Series	Films	Songs
Number of viewers	70	20	45	35	30

a If a viewer is chosen at random , what is the probability that he is a viewer of :

(1) News. (2) Songs. (3) Sports.

(4) Series. (5) Films.

b If the number of viewers in the sample is 800 , how many viewers are predicted to prefer news ?

4 **The following data shows the result of a survey of asking 40 students about means of transport students use to go to school :**

Means of transport	Bicycle	Bus	Private car	On foot
The number	10	15	9	6

a If a student is selected randomly , what is the probability that the student goes to school by bus ?

b If the number of students in the school are 800 students , what is the predicted number of students using private car ?

5 **The following table shows the evaluation of 50 students in one month :**

Estimate	Excellent	Very good	Good	Pass	Fail
Number	6	9	11	16	8

a A student is randomly selected. What is the probability of getting a score of excellent ?

b If the number of students in the school is 1000 students , how many students are predicted to get a score of very good ?



6 A survey was applied to ask 10 students about the foreign language they prefer to study. 5 students prefer English , 3 students prefer French and 2 students prefer German. If the total number of students in the school is 600 students :
How many students are predicted to prefer studying German ?

7 Tourists successively visit Egypt. A tourist company has organized a trip for 100 tourists to visit Egypt , 40 from Arab countries , 30 from Europe , 10 from America and 20 from Asia. The number of tourists who visited Egypt in this month was 15000 tourists.
What is the predicted number of tourists from Europe who visited Egypt in this month ?



8 A survey has been applied on 50 students spending their summer time , the result was as follows : 12 students prefer going beaches , 14 students prefer going to clubs , and the rest of students prefer going to the countryside.



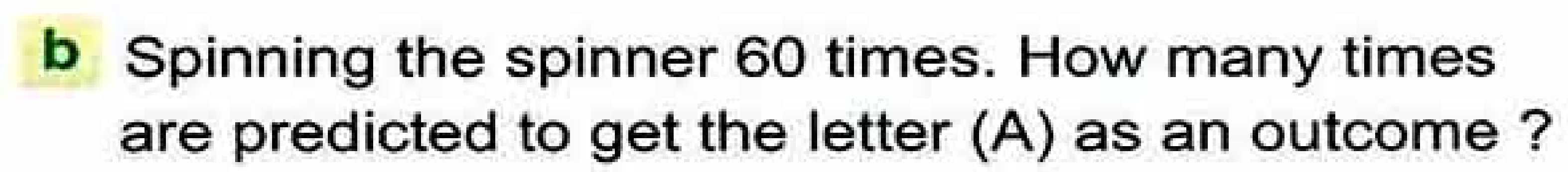
a What is the probability that one of them spends his summer in the countryside ?

b What is your prediction about the number of students preferring to spend their summer time in the countryside out of 500 students ?

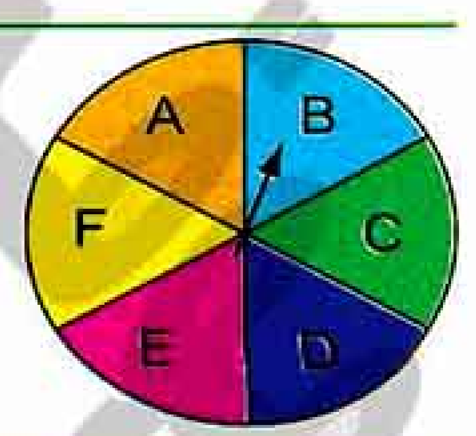
9 A spinner is divided into 6 equal sections :



a What is the probability of spinning on any section ?



b Spinning the spinner 60 times. How many times are predicted to get the letter (A) as an outcome ?



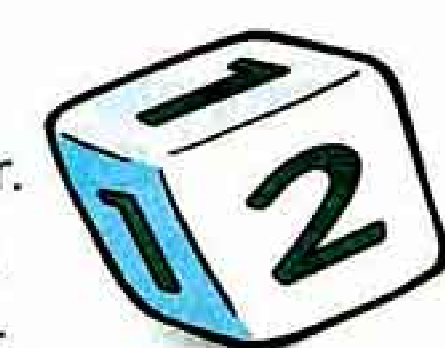
10 In a mixed school , there are 1500 pupils.
A random sample formed from 200 pupils is selected. It is found that the number of girls equals 90
What is the expected number of girls in the school ?





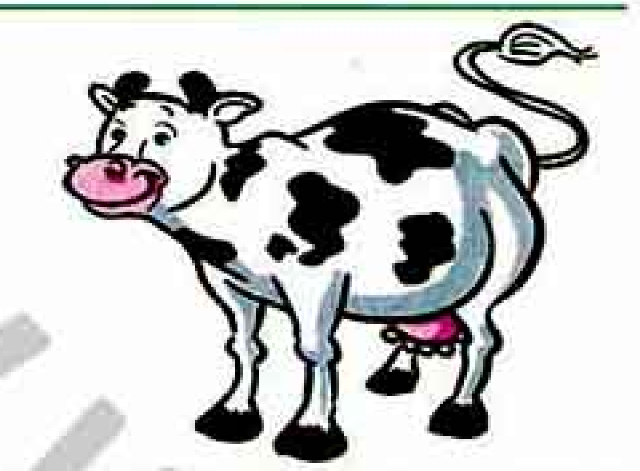


11 A sample of 40 balls : 5 are red and the rest is in different colours. What is the predicted number of red balls when the sample contains 400 balls ?



12 Eman , Amal and Maha clean their school in turns. They roll a number cube with two faces numbered 1 , two faces numbered 2 and two faces numbered 3
Eman does the cleaning if the faces numbered 1 appear.
Amal does the cleaning if the faces numbered 2 appear.
Maha does the cleaning if the faces numbered 3 appear.
How often do you predict each one does the cleaning within a 30-day month ?

13 A farm has 2000 cows. If the probability that they get infected with cow-madness in this farm is 0.17
What is the number of cows expected to be infected with this disease ?



14 Electric lamps manufacturing company keeps track of 1000 lamps of its production to know the maximum working hours before tearing down.



The following table lists these data :

Maximum working hours	less than 150 h	150 - 400 h	400 - 1000 h	more than 1000 h
Number of lamps	80	250	350	320

If you bought a lamp from this company , what is the probability to tear down ?

a Before 150 working hours.

b After 400 working hours.





Challenge

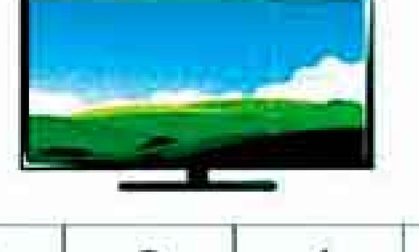


15 53 of 100 school students prefer reading the books of the Family Library on a survey has been applied.

How many students don't read such books out of 400 students ?

16 A factory of electric sets produces two kinds of televisions. In order to change the amount of production due to the requests of shopping market , a sample is formed from 50 TV sets from 5 shops randomly. Its data was as follows :





Index of shop	1	2	3	4	5
Number of sold TV sets from the 1st kind	30	42	24	15	40
Number of sold TV sets from the 2nd kind	20	8	26	35	10

(1) Which kind is more requested ? And what is your advice to the factory ?

(2) If the total production of this factory is 3000 TV sets. What is the expected number from the first kind ?

17 Two players , in a football team. During the training , one of them kicked 21 penalty kicks , he scored 18 goals , the other kicked 32 penalty kicks , he scored 25 goals. Which of them do you select to kick a penalty kick during the match ? Why ?







Lesson 2 Theoretical probability

Prelude

Sample space of an experiment :

The **sample space of an experiment** is the set of all possible outcomes of this experiment. It is usually denoted by (S)

For Example :

- **Tossing a regular coin** once , then S = {Head , Tail}
- **Rolling a regular die** once and observing the apparent number on the upper face , then S = {1 , 2 , 3 , 4 , 5 , 6}
- **Playing a football match** and determining the result of a team , then S = {win , loss , draw}



Event

In an experiment, **an event** is any subset of the sample space of this experiment.

For Example :

If we throw a regular die once and observe the apparent number on the upper face, then : $S = \{1, 2, 3, 4, 5, 6\}$

To appear **an odd number**, then the outcomes are **1, 3 and 5**

i.e. the event of appearance of an odd number $= \{1, 3, 5\} \subset S$

Theoretical probability

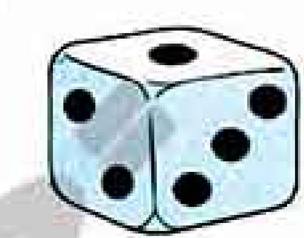
Theoretical probability is finding the probability of events that come from a sample space of outcomes having equal chance to occur.

For Example :

- When we toss a regular coin and observe the apparent face, then we find one chance of two chances will occur (either head or tail)




- When we roll a fair die and observe the number on the upper face, then the chance of appearance of each face is the same.



How to calculate theoretical proability ?

$$\text{The probability of an event to be occurred} = \frac{\text{Number of outcomes of the event}}{\text{Number of all possible outcomes}}$$

Remark

A theoretical probability would be the same as the **experimental probability** if you could run an **experiment** an **infinite** amount of time.



Example 1

The opposite figure represents a spinner game divided into 6 equal circular sectors. If the pointer is spinned once, find the probability that the spinner stops at :



[a] an even number.

[b] a number greater than 2

[c] the number 5

[d] a number less than 1

[e] a number less than 7

Solution

S = {1 , 2 , 3 , 4 , 5 , 6} , its number of elements = 6

[a] The event of spinning on an even number = {2 , 4 , 6} ,
its number of elements = 3,
then the probability of spinning on an even number = $\frac{3}{6} = \frac{1}{2}$

[b] The event of spinning on a number greater than 2 = {3 , 4 , 5 , 6} ,
its number of elements = 4,
then the probability of spinning on a number greater than 2 = $\frac{4}{6} = \frac{2}{3}$

[c] The event of spinning on the number 5 = {5} ,
its number of elements = 1,
then the probability of spinning on the number 5 = $\frac{1}{6}$

[d] The event of spinning on a number less than 1 = ∅ ,
its number of elements = 0 "because there is no number less than 1" ,
then the probability of spinning on a number less than 1 = $\frac{0}{6} = 0$
"the impossible event"

[e] The event of spinning on a number less than 7 = {1 , 2 , 3 , 4 , 5 , 6} ,
its number of elements = 6,
then the probability of spinning on a number less than 7 = $\frac{6}{6} = 1$
"the certain event"

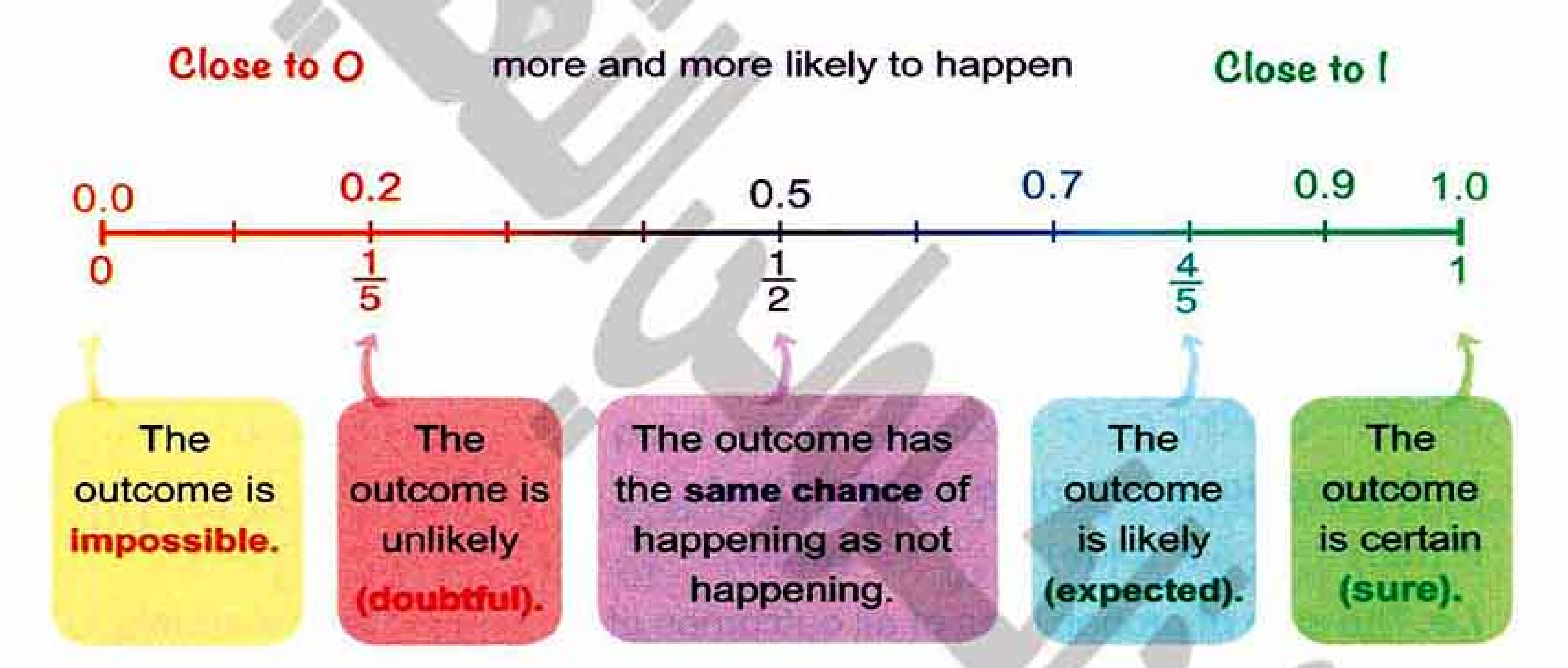


Notice

From the previous, we find that :

- The probability of the **impossible event** is 0
- The probability of the **certain (sure) event** is 1
- The probability of **any other events** is between 0 and 1

All probabilities can be marked on a probability scale **as follows** :



Example 2

A bag contains an amount of marbles of the same size and softness. If 2 marbles are red , 3 marbles are blue and 5 marbles are white.

A marble is selected randomly.

Calculate :



[a] The probability that the selected marble is red.

[b] The probability that the selected marble is blue.

[c] The probability that the selected marble is white.

[d] The probability that the selected marble is not blue.

[e] The probability that the selected marble is blue or white.





Solution

The total number of marbles = 2 + 3 + 5 = 10 marbles.

[a] P (red) = $\frac{\text{number of red marbles}}{\text{total number of marbles}} = \frac{2}{10} = \frac{1}{5}$

[b] P (blue) = $\frac{\text{number of blue marbles}}{\text{total number of marbles}} = \frac{3}{10}$

[c] P (white) = $\frac{\text{number of white marbles}}{\text{total number of marbles}} = \frac{5}{10} = \frac{1}{2}$

[d] The number of the marbles which are **not blue** = 10 – 3 = 7 ,

then P (not blue) = $\frac{\text{number of the marbles which are not blue}}{\text{total number of marbles}} = \frac{7}{10}$

[e] P (blue or white) = $\frac{3}{10} + \frac{5}{10} = \frac{8}{10} = \frac{4}{5}$.

Remark

In the previous example , notice that :

P (red) = $\frac{2}{10}$, P (blue) = $\frac{3}{10}$, P (white) = $\frac{5}{10}$, $\frac{2}{10} + \frac{3}{10} + \frac{5}{10} = 1$

i.e. The sum of probabilities of all outcomes of the sample space equals 1 , then the probability that an event A does not occur is 1 – P (A)

According to this , we can find the probability that the selected marble is not blue **as follows :**

Since the probability that the selected marble is blue = $\frac{3}{10}$,

then the probability that the selected marble is **not blue** = 1 – probability that it is blue = $1 - \frac{3}{10} = \frac{7}{10}$







Example 3




In a class, some pupils wear glasses and others don't wear glasses. If one pupil is chosen randomly from this class and the probability that this pupil wears glasses is 0.1

[a] Find the probability that the pupil doesn't wear glasses.

[b] If the number of pupils in this class is 30 pupils , find the expected number of pupils who wear glasses.

Solution

[a] The probability that the pupil doesn't wear glasses =
1 – probability that the pupil wears glasses = 1 – 0.1 = 0.9

[b] The expected number of pupils who wear glasses = 0.1 × 30 = 3 pupils.



- **A box contains cards numbered from 1 to 15 , if a card is drawn randomly.**
  What is the probability that the number on the drawn card is divisible by 5 ?



Exercise 23 Theoretical probability

From the school book

1 If we roll a regular number cube (die) , then complete the following :

a The probability of getting a number greater than 4 = ...

b The probability of getting a number less than 3 = ...

c The probability of getting an even number = ...

d The probability of getting an odd number = ...

e The probability of getting a prime number = ...

f The probability of getting the number 5 = ...

g The probability of getting the number 7 = ...

h The probability of getting a number less than or equal to 6 = ...

i The probability of getting the number greater than 6 = ...

j The probability of getting a prime even number = ...

k The probability of getting a number divisible by 3 = ...

l The probability of getting an even number and not divisible by 3 = ...

2 Choose the correct answer from those given :

a Tossing a regular coin , the probability of landing a head = ...

($\frac{1}{3}$ or $\frac{1}{2}$ or $\frac{3}{4}$ or 1)

b The probability of an impossible event = ...

(∅ or 1 or 0 or 2)

c The probability of the certain event = ...

(0 or 1 or 100 or ∅)

d The probability that the elephant flies is ....

(0 or 1 or 10 or ∅)

e It is .... that the sun rises from east.

(possible or impossible or expected or sure)





f A basket contains cards numbered from 1 to 20 , if a card is drawn at random , what is the probability that the number written on the card is divisible by 6 ? ($\frac{3}{20}$ or $\frac{4}{20}$ or $\frac{5}{20}$ or $\frac{6}{20}$)

g A bag has 5 red balls and 3 white balls. If the balls are similar and a person draws a ball randomly , then the probability that the drawn ball is white = ... ($\frac{3}{5}$ or $\frac{3}{8}$ or $\frac{5}{8}$ or $\frac{5}{3}$)

h A letter of the word "Ahmed" is selected randomly. What is the probability of selecting the letter "d" ?

($\frac{1}{5}$ or $\frac{1}{4}$ or $\frac{1}{2}$ or 1)

i A letter is selected randomly from the word "ZAMALEK". The probability of selecting the letter A is ....

($\frac{1}{7}$ or $\frac{2}{7}$ or $\frac{3}{7}$ or $\frac{4}{7}$)

j 📖 A classroom holds 40 students , 25 are boys and the rest are girls. A student has been randomly selected , the probability of getting a girl is .... ($\frac{3}{8}$ or $\frac{5}{8}$ or $\frac{3}{5}$ or 1)

k There are 25 boys and 20 girls in a classroom. One pupil is chosen randomly. The probability that the chosen pupil is a girl equals ....

($\frac{1}{20}$ or $\frac{4}{9}$ or $\frac{1}{25}$ or $\frac{5}{9}$)

l 📖 The probability of the pupil's success in an exam is $\frac{8}{10}$, therefore the probability of failing is .... ($\frac{1}{2}$ or $\frac{1}{5}$ or $\frac{1}{4}$ or $\frac{2}{9}$)

m A bag contains 3 white balls , 2 black balls and one red ball. A ball is selected randomly from the bag. Then the probability that the selected ball is not black equals .... ($\frac{1}{2}$ or $\frac{1}{3}$ or $\frac{2}{3}$ or $\frac{1}{6}$)

3 Complete the following :

a 10 cards numbered from 1 to 10, if a card is drawn randomly , then the probability that the card is numbered by an odd number = ...



b When drawing a paper out of five identical papers numbered 1 , 2 , 3 , 4 and 5 , therefore the probability that the drawn paper has a prime number = ...

c A box has 5 white balls , 7 red balls , 3 blue balls. If a ball is drawn randomly from the box , then the probability that the ball is blue = ...

d In the experiment of throwing fair die once and observing the upper face , the probability that the apparent number is less than 1 equals ....

e If one of the digits of the number 867742231 is selected randomly , then the probability that the selected number is even equals ....

f A box contains 48 oranges and 4 oranges of them are bad. If an orange is drawn randomly , then the probability that the drawn orange is bad = ... and the probability that the orange is good = ...

g An activity room has 3 doors numbered from 1 to 3 , if a student went out using one of them , then the probability that the student went out using the door number 2 is ....

h A box contains 24 lamps , 3 lamps are defective. A lamp has been randomly selected , the probability of getting a functional lamp = ...

i If the probability of the occurrence of an event is 0.6 , then the probability of the nonoccurrence of this event is ....

j A card has been drawn out of 5 cards containing the numbers :

32 25 14 63 27

The probability of selecting a number that the sum of its two digits is 9 = ...

4 A card has been randomly drawn out of 10 cards numbered from 1 to 10 Find the probability of getting :

a An odd number.

b A prime number.

c An even number greater than 6





5 8 cards , numbered by the opposite numbers , are put in a bag.
Bassim drew a card from these cards randomly. Find :

12	18	10	48
24	15	36	17

a The probability that the card carries a number whose tens digit is even.

b The probability that the card carries a number whose units digit is odd.

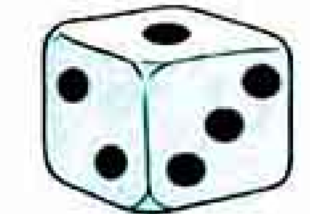
c The probability that the card carries a number multiple of 4

6 A box contains 20 cards numbered from 1 to 20
Randomly a card has been selected. Calculate the probability of selecting :

a A prime number.

b A number divisible by 7

7 If a fair dice is thrown once , what is the probability of each of the following events ?



a Getting an even number less than or equal to 4

b Getting a number between 0 and 10

c Getting a number divisible by 7

d Getting a number that is not divisible by 2

8 A bag contains 3 white balls , 7 red balls , and 5 yellow balls.
All the balls are equal in size. If a ball is randomly drawn :

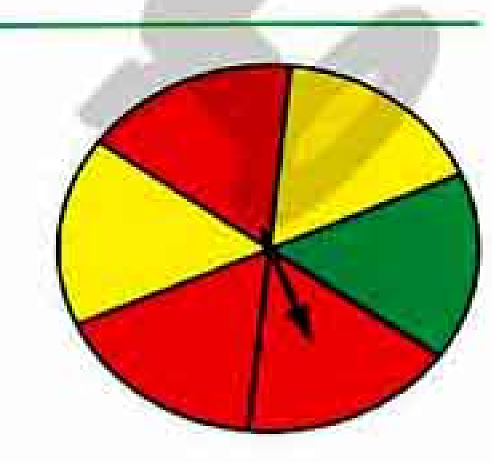
a What is the probability that the drawn ball is white ?

b What is the probability that the drawn ball is not red ?

9 **In the opposite figure :**



The spinner is divided into 6 coloured sections.
What is the probability that the spinner stops at :



a Red.

b Black.

c Green.





10 The opposite figure represents a spinner game :

a Find the probability that the pointer stops at :

(1) the red colour. (2) the green colour.

(3) the yellow colour.

b Find the probability that the pointer does not stop at the red colour.

11 A bag contains 5 red balls , 3 yellow balls and 2 black balls. If all balls are alike and a ball is drawn from the bag randomly , find :

a The probability that the drawn ball is yellow.

b The probability that the drawn ball is yellow or red.

c The probability that the drawn ball is not yellow.

d The probability that the drawn ball neither red nor yellow.

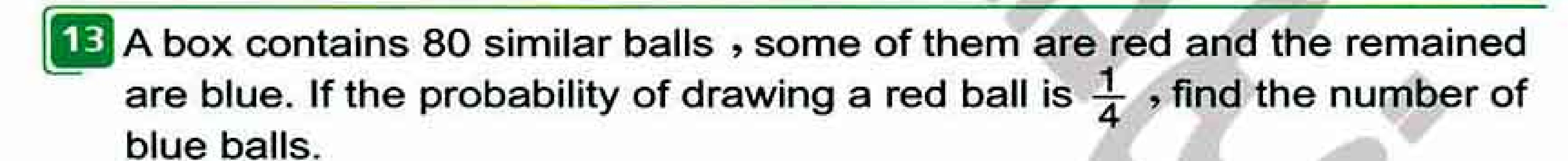
12 A bag contains 6 red balls and 4 green balls :

a Find the probability of selecting at random :

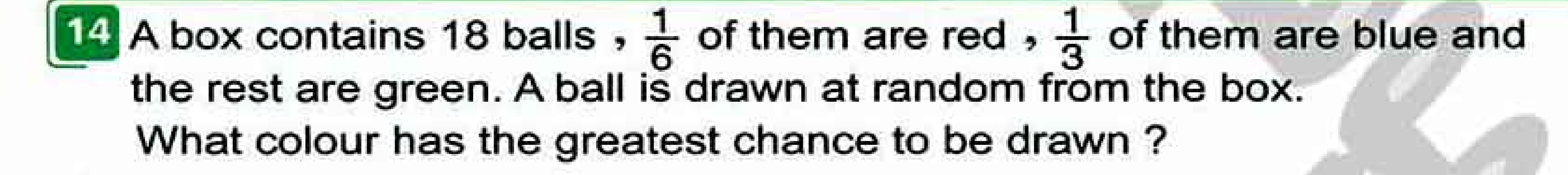
(1) a red ball. (2) a green ball.

b One red ball is removed from the bag.
Find the new probability of selecting at random :

(1) a red ball. (2) a green ball.



13 A box contains 80 similar balls , some of them are red and the remained are blue. If the probability of drawing a red ball is $\frac{1}{4}$, find the number of blue balls.



14 A box contains 18 balls , $\frac{1}{6}$ of them are red , $\frac{1}{3}$ of them are blue and the rest are green. A ball is drawn at random from the box.
What colour has the greatest chance to be drawn ?

Challenge

15 A class has 50 students , the number of girls is less than the number of boys by 10 If a student is chosen randomly , find the probability that the student is a boy.



Test on unit four

Answer the following questions :

1 Choose the correct answer from the given ones :

1. The probability of the certain event ....
(∅ or zero or 0.5 or 1)

2. The probability that the elephant flies = ...
(1 or zero or ∅ or $\frac{1}{2}$)

3. As tossing a metallic coin once , then the probability of appearing a head is .... ($\frac{1}{2}$ or $\frac{1}{4}$ or 1 or $\frac{3}{4}$)

4. As throwing a fair die once and observing the appearing number on the upper face , then the probability of appearing an odd number is ....
($\frac{1}{3}$ or $\frac{1}{2}$ or $\frac{5}{6}$ or 1)

5. As class 24 pupils , 9 of them are boys and the remainder are girls , if a pupil is chosen randomly, then the probability that the pupil is a girl is .... ($\frac{1}{2}$ or $\frac{5}{8}$ or 1 or $\frac{1}{4}$)

6. A letter of the word "school" is selected randomly. What is the probability of selecting the letter "o" ? ($\frac{2}{5}$ or $\frac{1}{2}$ or $\frac{1}{3}$ or $\frac{1}{4}$)

7. It is .... that the sun rises from west.
(possible or impossible or sure)

8. The probability of the student's success in an exam is $\frac{9}{10}$, then the probability of failing is .... ($\frac{1}{9}$ or 0.1 or 0.9 or 1)

9. The sum of probabilities of all outcomes of the sample space equals .... (0 or $\frac{1}{2}$ or 1 or 2)



10 When drawing a paper out of five identical papers numbered 1 , 2 , 3 , 4 and 5 , therefore the probability that the drawn paper has an even number is .... (2 or $\frac{2}{5}$ or $\frac{2}{3}$ or $\frac{1}{5}$)

11 As throwing a fair die once , then the probability of appearing a number less than 3 is .... ($\frac{1}{6}$ or $\frac{1}{3}$ or $\frac{1}{4}$ or $\frac{2}{5}$)

12 A box contains cards numbered from 1 to 15 , if a card is drawn randomly , then the probability that the number on the drawn card is a factor of the number 12 is .... ($\frac{2}{5}$ or $\frac{7}{15}$ or $\frac{3}{4}$ or $\frac{6}{9}$)

13 A basket contains 36 apples and 4 apples of them are bad , if an apple is drawn randomly , then the probability that the drawn apple is good = ... (32 or $\frac{1}{9}$ or $\frac{8}{9}$ or $\frac{1}{6}$)

14 A sample of 50 balls , 8 are yellow and the rest in different colours , then the predicted number of yellow balls when the sample contains 500 balls is .... (42 or 80 or 420 or 500)

2 Complete each of the following :

15 The probability of the impossible event = ...

16 The probability of any possible event is between 0 and ....

17 As tossing a regular coin once , the probability of landing a tail = ...

18 As throwing a fair dice once and observing the appearing number on the upper face, then the probability of appearing a number divisible by 2 is ....

19 A subset of the sample space is ....





20 A letter of the word "seven" is selected randomly , then the probability of selecting the letter "e" is ....

21 The probability of an event = $\frac{\text{.......................}}{\text{.......................}}$

22 As throwing a metallic coin once , then the sample space = ... and the number of elements of the sample space = ...

3 Answer the following :

23 A bag contains 5 white balls , 9 red balls and 6 black balls , all the balls are identical and equal in size , if a ball is drawn randomly. What is the probability that the drawn ball is :

[a] White. [b] Not white. [c] White or red.

24 As throwing a fair die once, what is the probability of getting :

[a] A number less than or equal to 6 [b] A number more that 6

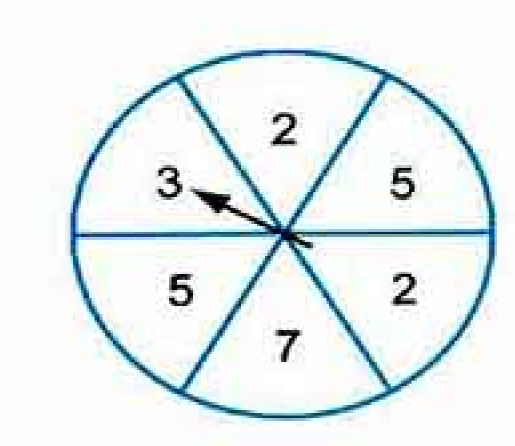
[c] A number divisible by 3 [d] A prime number.

25 A box contains 22 cards numbered from 1 to 22 , if a card is drawn randomly, calculate the probability that the drawn card carries :

[a] An odd number. [b] An even prime number.

[c] A number divisible by 7 [d] A number less than 6

26 The opposite figure is a spinner is divided into 6 equal circular sectors, find the probability that the pointer will stand on :



[a] The number 2

[b] A number greater than 5

[c] A number less than 2

TIMSS QUESTIONS





TIMSS* Questions

First : Choose the correct answer :

1. The number 3.015 lies between ………… on the number line.
   (a) $\frac{5}{2}$ and 3 (b) $\frac{7}{2}$ and $\frac{11}{3}$
   (c) 3 and $\frac{16}{5}$ (d) 3.12 and 3.15

2. $2 \div 0.005 =$ …………
   (a) 4 (b) 40 (c) 400 (d) 4000

3. The smallest number of the numbers below is …………
   (a) 0.125 (b) 0.7 (c) 0.32 (d) 0.0625

4. A road of length 7 km. approximated to the nearest kilometre, then which of the following may be its real length ?
   (a) 6852 m. (b) 7695 m. (c) 645 m. (d) 7.5 m.

5. Ahmed runs around a playground of perimeter 0.4 km., if he run 4 km., then he run around the playground ………… periods.
   (a) 1 (b) 4 (c) 6 (d) 10

6. Which of the following sets of numbers in the order to complete the pattern $\frac{1}{5}$, 0.4, $\frac{3}{5}$, …………, …………, …………, $\frac{7}{5}$?
   (a) 0.8, $\frac{6}{5}$, 1.2 (b) 0.8, 1, 1.2 (c) 0.6, 0.8, 1 (d) 0.8, 1, 1.4

7. If the factorization of a number as shown in the opposite figure :
   Then x + y + z = …………
   (a) 10 (b) 30 (c) 38 (d) 360

x	5
y	3
z	2
	1

8. The best unit from the following units to measure the height of a house is …………
   (a) centimetre (b) decimetre (c) metre (d) kilometre

* TIMSS : Trends of the International Mathematics and Science Studies.



9 The value of the digit 7 in the number 0.042735 is ....

(a) $\frac{7}{100000}$ (b) $\frac{7}{10000}$ (c) $\frac{7}{1000}$ (d) $\frac{7}{100}$

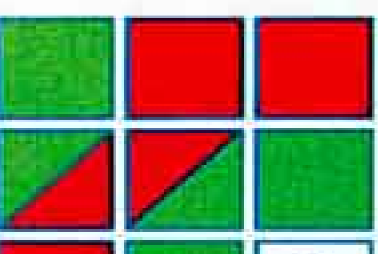
10 The next number in the same pattern for the number $\frac{2}{3}$, $\frac{5}{6}$, $\frac{11}{12}$, $\frac{23}{24}$, ... is ....

(a) $\frac{29}{30}$ (b) $\frac{35}{36}$ (c) $\frac{45}{46}$ (d) $\frac{47}{48}$

11 The smallest fraction of the following fractions is ....

(a) $\frac{1}{2}$ (b) $\frac{3}{4}$ (c) $\frac{5}{8}$ (d) $\frac{7}{16}$

12 What is these square which be add to the opposite figure to get the area of red colour equals to the area of green colour ?



(a) (b)



(c) (d)

13 If ♡ + ♧ = 30 , ♡ + ♧ + ♧ = 50 , then ♡ = ...

(a) 10 (b) 20 (c) 30 (d) 40

14 The rectangle has .... axes of symmetry.

(a) 1 (b) 2 (c) 3 (d) 4

15 The probability of the impossible event = ...

(a) 0 (b) 1 (c) $\frac{1}{2}$ (d) 2

16 0.6 + ... = 1

(a) 4 (b) 0.4 (c) 1.6 (d) 0.5

17 The triangle ABC ≡ the triangle XYZ , then ∠ B ≡ ....

(a) ∠ X (b) ∠ Y (c) ∠ Z (d) ∠ A

18 $3\frac{2}{7}$ = ... (as an improper fraction)

(a) $\frac{23}{7}$ (b) $\frac{6}{7}$ (c) $\frac{12}{7}$ (d) $\frac{32}{7}$



19 0.17 is less than ....
(a) 0.09 (b) 0.14 (c) 0.5 (d) 0.075

20 9348 ≃ 9350 (to the nearest ....)
(a) unit (b) ten (c) hundred (d) thousand

21 The smallest prime number is ....
(a) 1 (b) 2 (c) 3 (d) 5

22 The number .... is divisible by 3
(a) 28 (b) 13 (c) 17 (d) 24

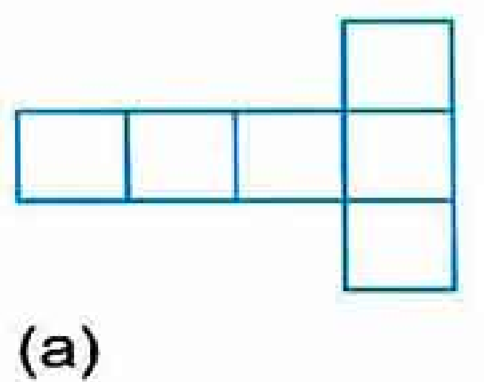
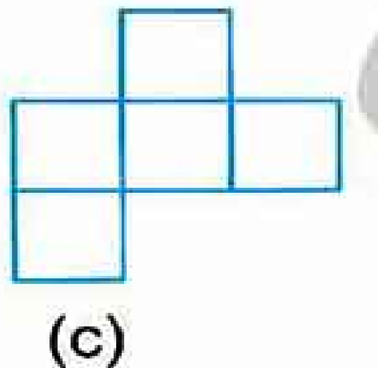
23 H.C.F. of 12 and 18 is ....
(a) 12 (b) 2 (c) 6 (d) 3

24 Pentagon is a polygon of .... sides.
(a) 3 (b) 4 (c) 5 (d) 6

25 The perimeter of a square is 28 cm., then its area = ... cm^2
(a) 7 (b) 14 (c) 49 (d) 112

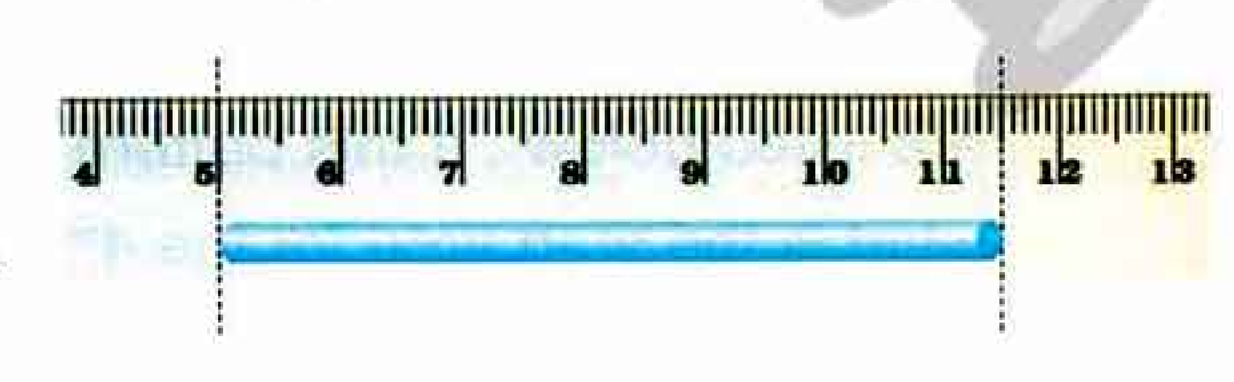
26 How many tens are in the number 160 ?
(a) 6 (b) 16 (c) 60 (d) 100

27 Each of the following figures can folded to be a cube except the figure ....

(a) (b) (c) (d)

28 **In the opposite figure :**
The length of the tube in centimetres equals ....



(a) 6 (b) 6.5
(c) 7 (d) 7.5



29 When you throw a dice once, the probability of getting the number 5 is ....

(a) $\frac{5}{6}$ (b) $\frac{1}{5}$ (c) $\frac{1}{6}$ (d) 1

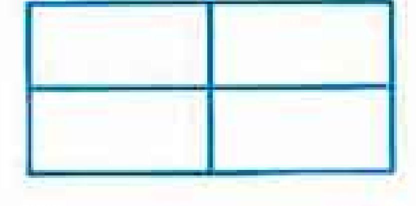
30 **In the opposite figure :**

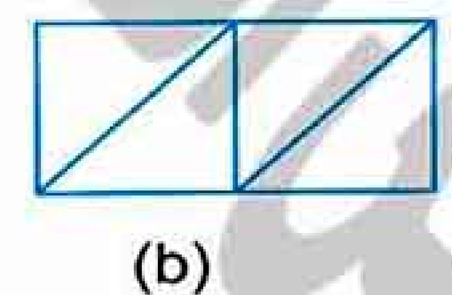
Which number is in the square and the circle but is not in the triangle ?

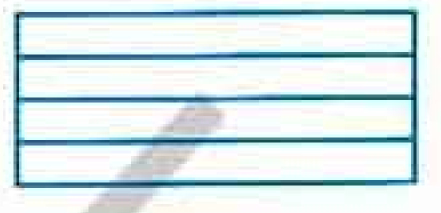
(a) 2 (b) 3

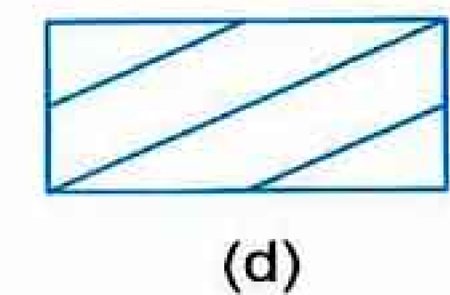
(c) 4 (d) 5

31 Which rectangle is not divided into 4 equal parts ?


(a)


(b)


(c)


(d)

32 Which of these could equal 150 millitres ?

(a) The amount of water in a cup (b) The length of a pen

(c) The weight of an egg (d) The area of a coin

33 The rule for the table is that numbers in each row and column must add up to the same number. What number goes in the centre of the table ?

4	11	6
9		5
8	3	10

(a) 1 (b) 2

(c) 7 (d) 12

34 The daily start times for showing a movie are listed below : If this pattern continues, what is the start time for the 4th show ?

Show	Start Time
1st	2:00 p.m.
2nd	3:30 p.m.
3rd	5:00 p.m.
4th	?

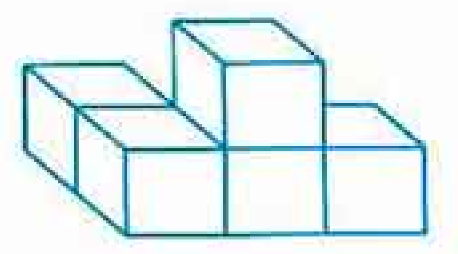
(a) 5:30 p.m. (b) 6:00 p.m.

(c) 6:30 p.m. (d) 7:00 p.m.

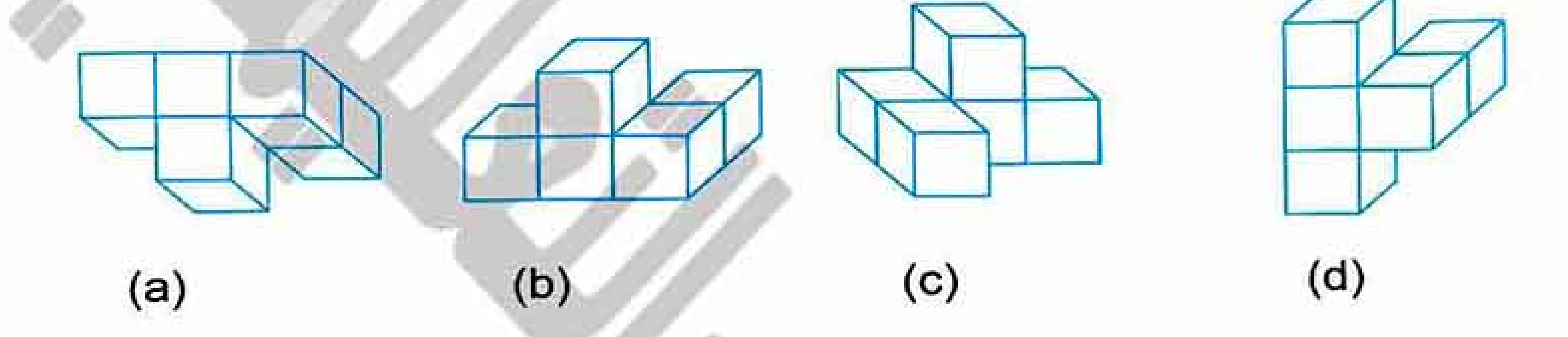




35 This figure will be turned to a different position.



Which of these could be the figure after it is turned ?

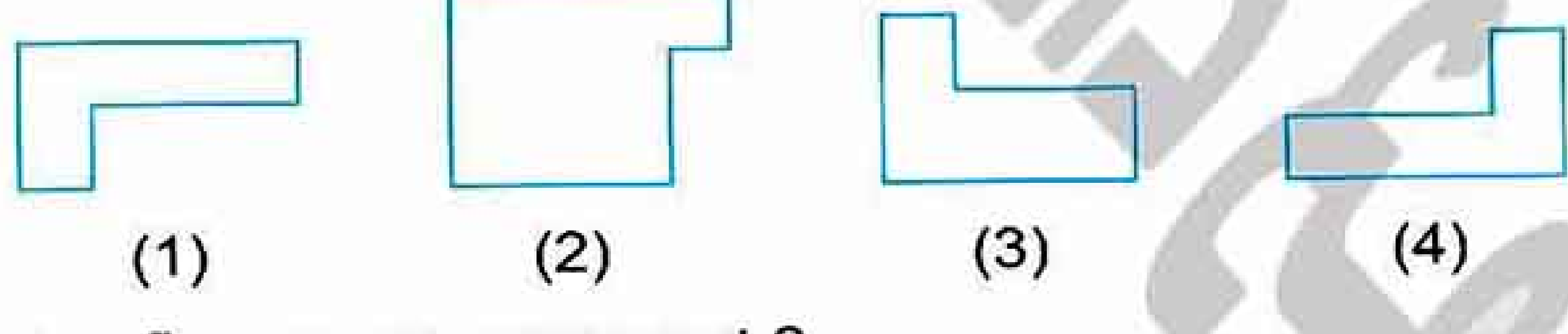


(a) (b) (c) (d)

36 Basma wanted to use her calculator to add 1379 and 243
She entered 1279 + 243 by mistake. Which of these could she do to correct the mistake ?

(a) Add 100 (b) Add 1
(c) Subtract 1 (d) Subtract 100

37 Figures that are the same size and shape are called congruent figures.



(1) (2) (3) (4)

Which two figures are congruent ?

(a) 1 and 2 (b) 1 and 3 (c) 1 and 4 (d) 3 and 4

38 This chart shows temperature readings made at different times on four days :

TEMPERATURES					
	6 a.m	9 a.m.	Noon	3 p.m.	8 a.m.
Monday	15°	17°	20°	21°	19°
Tuesday	15°	15°	15°	10°	9°
Wednesday	8°	10°	14°	13°	15°
Thursday	8°	11°	14°	17°	20°

When was the highest temperature recorded ?

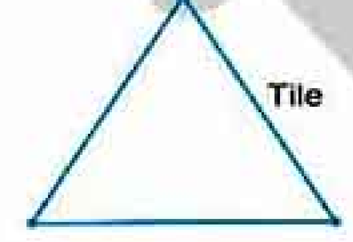
(a) Noon on Monday

(b) 3 p.m. on Monday

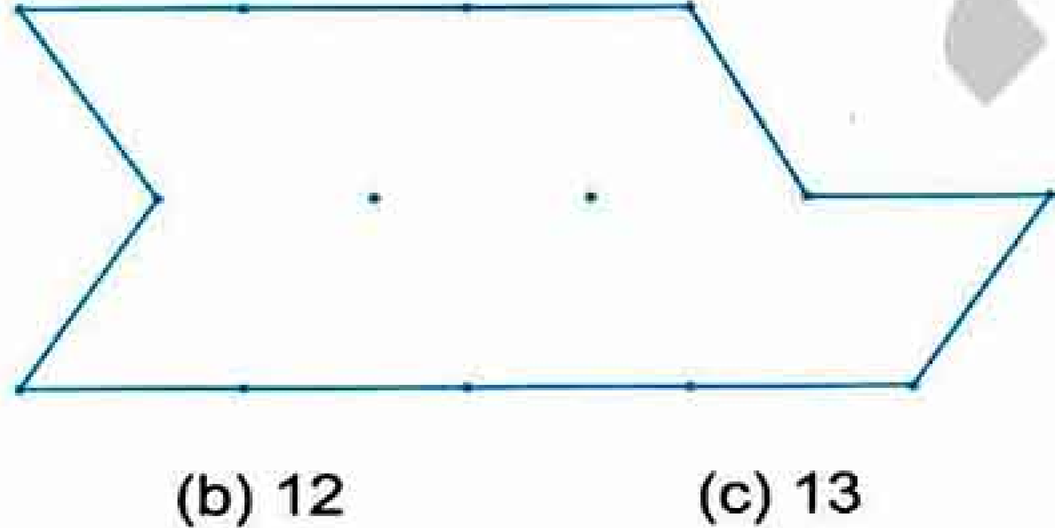
(c) Noon on Tuesday

(d) 3 p.m. on Wednesday

39 The triangle represents one tile in the shape of a triangle.

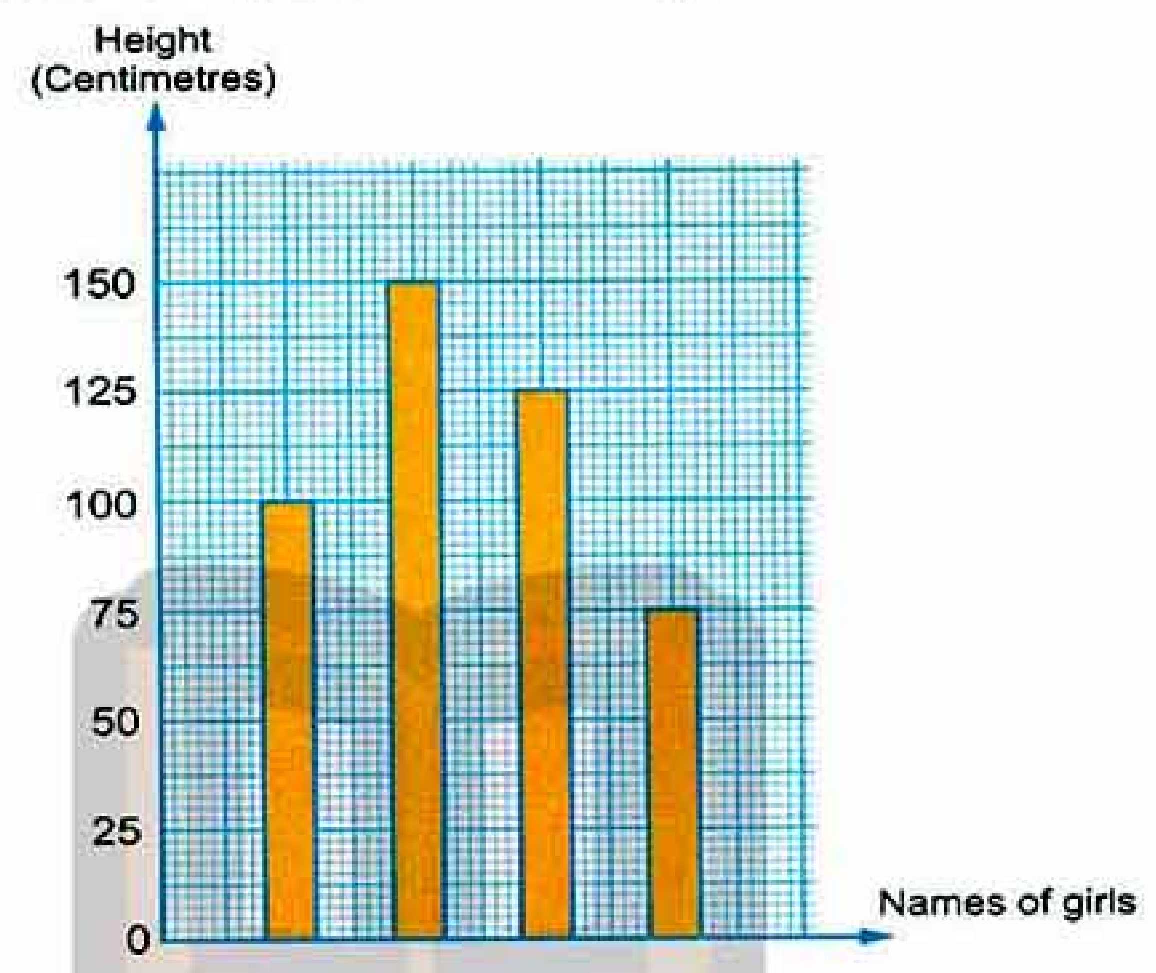


How many tiles will it take to cover the figure below ?



(a) 11 (b) 12 (c) 13 (d) 14

40 The graph shows the heights of four girls :



The names are missing from the graph. Dalia is the tallest. Amal is the shortest. Dina is taller than Sarah. How tall is Sarah ?

(a) 75 cm. (b) 100 cm. (c) 125 cm. (d) 150 cm.

Second : Answer the following questions :

1 Which is greater, the area of the square of side length 6 cm. or the area of the rectangle whose dimensions are 7 cm. and 5 cm. ?

2 If 756 pupils in a school are distributed equally among 18 classes. Find the number of pupils in each class.

3 Find H.C.F. and L.C.M. for the two numbers 12 and 16

4 Arrange the following numbers in an ascending order :

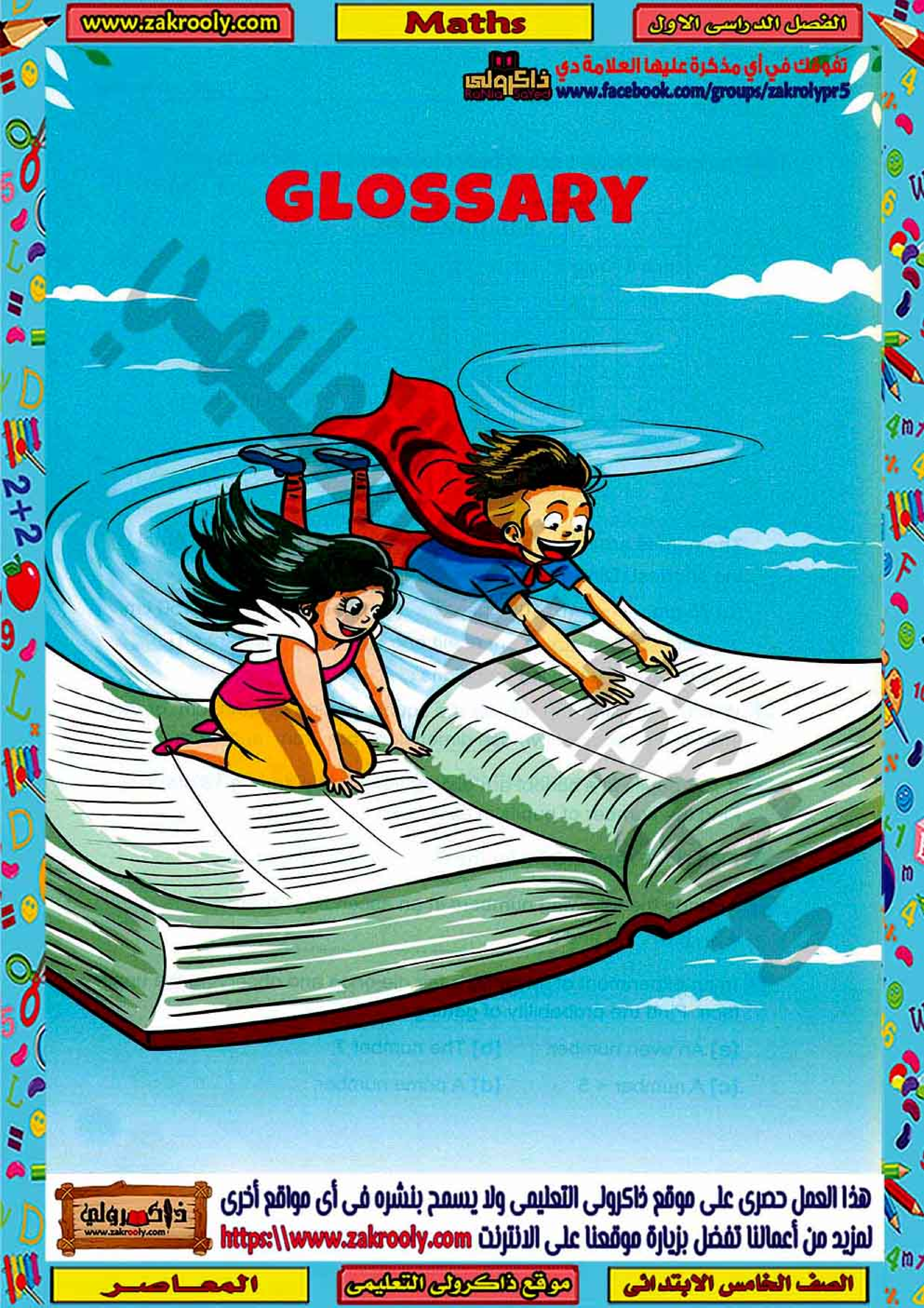
4.3 , 3.87, 3.9 and 2.8

5 In an experiment of throwing a fair die once and observing the upper face. Find the probability of getting :

[a] An even number. [b] The number 7

[c] A number < 5 [d] A prime number.





GLOSSARY

A

acceptable	مقبول
after	بعد
age	عُمر / سن
agricIture land	أراضى زراعية
altitude	عمودى
angle	زاوية
approximate	يُقرّب
approximation	تقريب
area	مساحة
arrange	يرتب
ascending	تصاعدى
associative	الدمج

B

bag	حقيبة
beautiful	جميل
beauty	الجمال
before	قبل
belong to	ينتمى إلى
between	بين
blank	فارغ
build	يبنى
building	مبنى
bundle	رُزمة من الورق

C

capacity	السعة
capital	عاصمة / رئيسى
carry	يحمل
cell	خلية
centre	مركز
certain	حقيقى
challenge	تحدى
check	يتأكد
chord	وتر
circle	دائرة
class	فصل
classify	يُصنّف
clear	واضح
clever	ماهر
clothes	ملابس
column	عمود
commutative	الإبدال
company	شركة
compare	يقارن
complement	يكمل
connect	يتصل
consider	يعتبر
consist of	يتكون من
convert	يحوّل
contain	يحتوى على
compasses	فرجار
count	يعد

D

daily	يوميًا
decimal	عشرى
defective	معطل
define	يعّرف
descending	تنازلى
dessert	حلوى
diagram	شكل هندسى ورياضى
diameter	قُطر
dice	حجر النرد
die	حجر النرد
difference	الفرق
direction	اتجاه
directly	مباشرة
discover	يكتشف
discribe	يوصف
discription	الوصف
distinguish	يميز / يصنف
dividend	المقسوم
divisior	المقسوم عليه

E

education	التربية



element	عنصر
employee	موظف
empty	فارغ / خالى
equal	مساوٍ لـ
error	خطأ
estimate	يخمّن
estimation	التخمين
equilateral triangle	مثلث متساوى الأضلاع
event	حدث
excellent	ممتاز
experiment	تجربة
express	يعبر عن
expression	تعبير
extend	يمد / يبلغ / يشمل

F

factory	مصنع
finger	إصبع اليد
finite	متناهٍ / محدود
foreign	أجنبى
fraction	كسر اعتيادى

G

general	عام
given	مُعطَى

H

height	ارتفاع

I

ignore	يتجاهل
impossible	مستحيل
include	يحتوى
inclusion	المحتوى
increase	يزيد
infinite	غير متناهٍ
ingredient	عنصر
inside	داخل
international	دولى
intersection	تقاطع
inverse	عكسى
isosceles triangle	مثلث متساوى الساقين

J

juice	عصير

K

knowledge	معرفة

L

lamp	مصباح
leave	إذن / يترك
length	طول
library	مكتبة
line segment	قطعة مستقيمة
listing	سرد
locate	يضع فى مكان معيّن

M

main	أساسى
measure	قياس / يقيس
merchant	تاجر
metal	معدن
method	طريقة
ministry	وزارة

N

national	قومى
need	يحتاج
next	التالى
null	فارغ / خالى

O

object	شئ
occur	يحدث
occurrence	حدوث
operation	عملية
opposite	مقابل / ضد
order	ترتيب / أمر
organize	ينظم / يؤسس
outside	خارج

P

pay	يدفع
perfume	عِطر
perpendicular	عمودى على / متعامد



piece قطعة
possible ممكن
precise محدد / صحيح
previous السابق
probability الاحتمال
problem مشكلة / مسألة
produce ينتج
product منتج / حاصل الضرب

Q

quotient خارج القسمة

R

radius نصف القطر
rainbow قوس قزح
random عشوائى
reach يصل
real حقيقى
relation علاقة
remainder باقى
remove يمحو
replace يبدِّل
represent يقدم
required المطلوب
result الناتج
road طريق
roll لفّة
rule قاعدة / قانون
ruler مسطرة

S

same نفس الشئ
sample نموذج
satisfy يحقق
scalene triangle مثلث مختلف الأضلاع
select يختار
set مجموعة
shade يظلل / ظل
sharp حاد
similar مشابه لـ
soap صابون
sometimes أحيانًا
state اذكر
study يدرس
subest مجموعة جزئية
suitable مناسب
sum مجموع/مبلغ من المال
sure أكيد
survey تقرير
symbol رمز

T

table جدول
tablet لوح / مكان للكتابة
theoretical نظريًا
thickness سُمك
throw يقذف
time وقت
tip رأس / طرف
tourist سائح
trader تاجر
tree شجرة
triangle مثلث
truck عربة نقل
type نوع

U

union اتحاد
unit وحدة
universal شامل

V

vegetables خضروات
vertex رأس / قمة

W

walk يمشى
week أسبوع
weight وزن
whole صحيح

Y

year عام



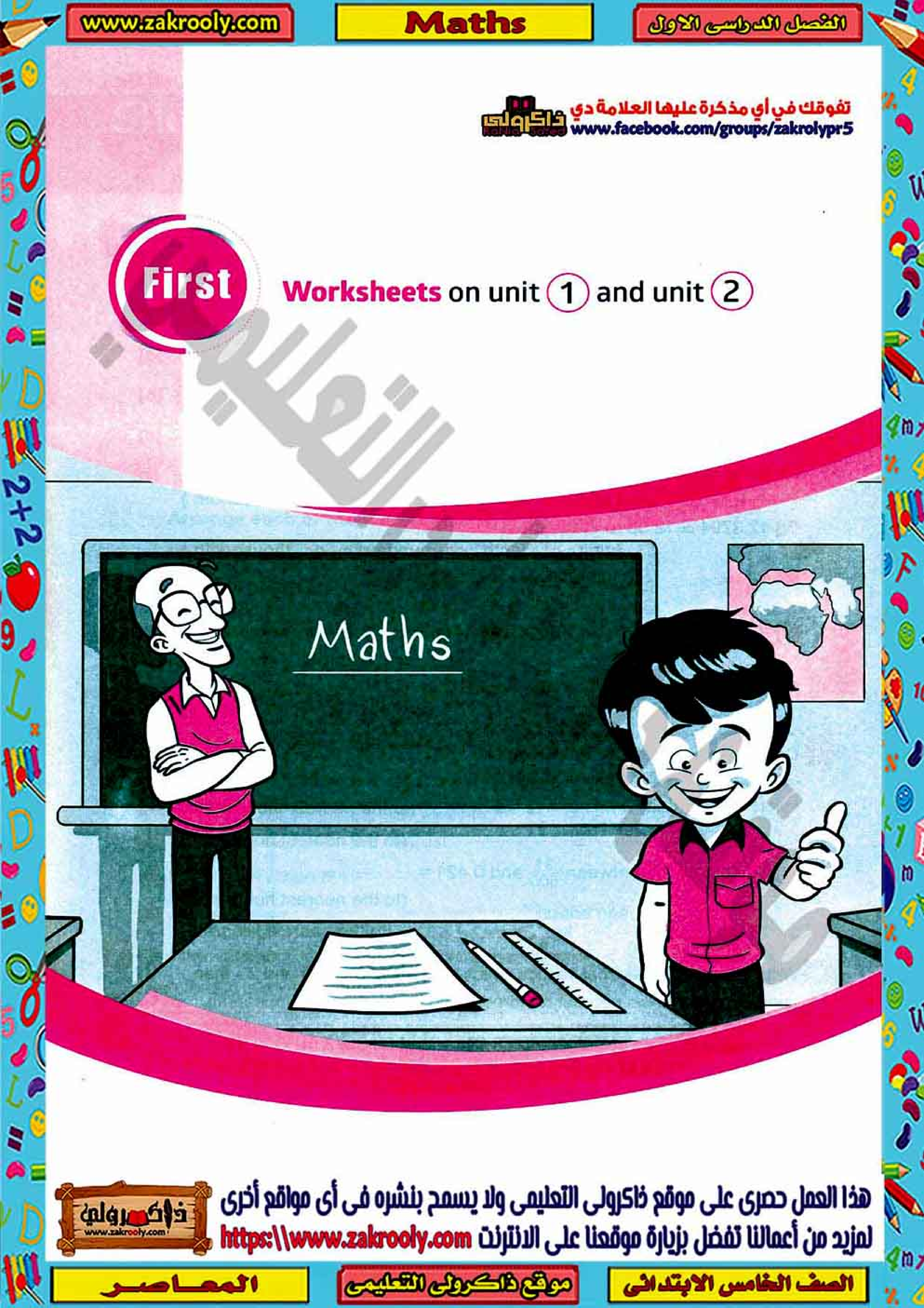


WORKSHEETS

First — Worksheets on unit (1) and unit (2)

Second — Worksheets on unit (3) and unit (4)

First Worksheets on unit 1 and unit 2










Sheet 1

On lesson 1 unit 1

1 Complete each of the following : (5)

[a] $0.7351 \simeq$ .... (to the nearest hundredth)

[b] $152.3017 \simeq$ .... (to the nearest thousandth)

[c] $\frac{2758}{1000} \simeq$ .... (to the nearest hundredth)

[d] $3\frac{18}{500} \simeq$ .... (to the nearest hundredth)

[e] $0.9998 \simeq$ .... (to the nearest thousandth)

2 Choose the correct answer : (5)

[a] $5.994 \simeq 5.99$ to the nearest ....
(unit *or* tenth *or* hundredth *or* thousandth)

[b] $12.3794 \simeq 12.38$ to the nearest ....
(unit *or* tenth *or* hundredth *or* thousandth)

[c] $4\frac{1}{8} \simeq$ .... to the nearest hundredth.
(4.125 *or* 4.12 *or* 4.13 *or* 4.1)

[d] 3 725 m. $\simeq$ .... to the nearest kilometre.
(3 *or* 4 *or* 37 *or* 3 730)

[e] 47 997 mL. $\simeq$ .... to the nearest litre.
(47.9 *or* 47 *or* 48.99 *or* 48)

3 Complete each of the following : (5)

[a] $14.372 + 15.449 =$ .... $\simeq$ .... (to the nearest hundredth)

[b] $17.48 - 9.3746 =$ .... $\simeq$ .... (to the nearest thousandth)

[c] $2\frac{3}{8} - \frac{4}{200} =$ .... $\simeq$ .... (to the nearest hundredth)

[d] The difference between $\frac{31}{500}$ and $0.421 =$ .... $\simeq$ ....
(to the nearest hundredth)

[e] 13 259 gm. $\simeq$ .... kg. (to the nearest kilogram)

4 Write the greatest decimal fraction which consists of 3 , 5 , 4 and 2 , then approximate it to the nearest hundredth and to the nearest thousandth. (2)

5 Two pieces of cloth are of length 85.91 m. and 82.3972 m. Find the sum of the lengths of the two pieces approximating the result to the nearest thousandth. (3)





Sheet 2



From lesson 1 unit 1
to lesson 2 unit 1

1 Put the suitable relation (>) , (<) or (=) :



[a] $\frac{7}{11}$ ☐ $\frac{5}{11}$

[b] $1\frac{9}{10}$ ☐ $2\frac{1}{10}$

[c] 1 ☐ $\frac{3}{5}$

[d] $\frac{3}{4}$ ☐ $\frac{5}{6}$

[e] 3.2 ☐ $3\frac{1}{2}$

[f] $\frac{61}{8}$ ☐ $7\frac{1}{2}$

2 [a] Arrange each of the following in an ascending order :



(1) $\frac{1}{2}$, $\frac{2}{5}$, $\frac{7}{10}$ and $\frac{1}{4}$

(2) 2.4 , $2\frac{1}{2}$, $3\frac{4}{5}$ and $1\frac{1}{2}$

[b] Arrange each of the following in a descending order :

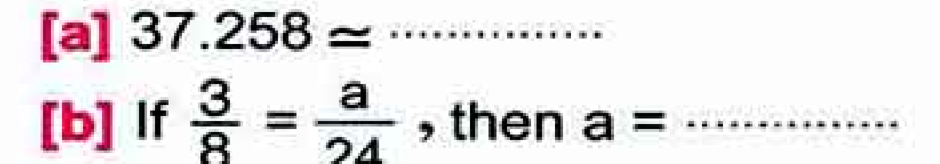
(1) $\frac{1}{2}$, $\frac{7}{8}$, 1 and $\frac{2}{5}$

(2) $\frac{1}{4}$, 0.8 , 0.4 , $\frac{1}{2}$ and $\frac{3}{4}$

3 Complete each of the following :

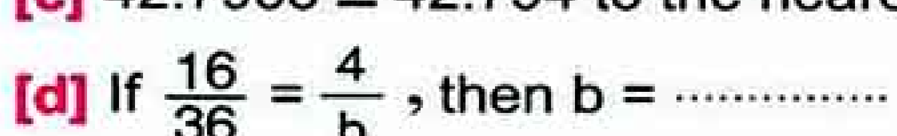



[a] 37.258 ≃ .... (to the nearest hundredth)



[b] If $\frac{3}{8} = \frac{a}{24}$, then a = ...

[c] 42.7935 ≃ 42.794 to the nearest ....



[d] If $\frac{16}{36} = \frac{4}{b}$, then b = ...

[e] $\frac{3}{500}$ ≃ .... (to the nearest hundredth)

4 Find the values of x that satisfies the relation $\frac{3}{8} < \frac{x}{8} < \frac{9}{8}$ such that x is a whole number.



5 Write the smallest decimal fraction which consists of 3 , 9 , 2 and 4 , then approximate it to the nearest thousandth.





Total mark 20



From lesson 1 unit 1 to lesson 3 unit 1

1 **Complete each of the following :** (5)

[a] 32.563 × 100 = ...

[b] 25.0825 ≃ .... (to the nearest thousandth)

[c] 7.003 kg. = ... gm.

[d] If $\frac{3}{7} = \frac{x}{21}$, then x = ...

[e] $4\frac{5}{8}$ ≃ .... (to the nearest hundredth)

2 **Choose the correct answer :** (5)

[a] 4.162 × 100 .... 41.62 (> or < or =)

[b] 32.531 × 10 .... 0.32531 × 1 000 (> or < or =)

[c] 572.4 cm. ≃ .... m. "to the nearest metre"
(6 or 50 or 60 or 572)

[d] 37.756 ≃ 37.76 to the nearest ....
(tenth or hundredth or thousandth or unit)

[e] 7.04 × .... = 704 (10 or 100 or 1 000 or 10 000)

3 **Put (✓) for the correct statement and (✗) for the incorrect one :** (5)

[a] 5.47 × 1 000 = 547 (   )

[b] If $\frac{3}{5} = \frac{a}{10}$, then a = 6 (   )

[c] 2.53 × 100 = 25.3 × 10 (   )

[d] $3.7 < 3\frac{5}{8}$ (   )

[e] 2.5781 ≃ 2.58 (to the nearest 3 decimal places) (   )

4 If the price of a piece of sweet is 2.25 pounds. (2)
What is the price of 10 pieces of the same kind ?

5 **[a] Find the result of each of the following :** (3)

(1) (37.21 + 3.4) × 10 = ...

(2) (7.742 × 100) – 32.4 = ...

[b] Arrange the following numbers ascendingly :

$4\frac{1}{4}$, 4.025 , 4.375 and $4\frac{1}{8}$

Sheet 4

From lesson 1 unit 1 to lesson 4 unit 1





1 **Find the product of each of the following :** (5)

[a] 53 × 0.7 = ...

[b] 24 × 0.06 = ...

[c] 14 × 0.003 = ...

[d] 5.4 × 3.2 = ...

[e] 2.1 × 0.34 = ...



2 **Choose the correct answer :** (5)

[a] 2.3 × 0.004 = ... (92 *or* 0.92 *or* 0.0092 *or* 0.092)

[b] 136.592 ≃ 136.6 to the nearest ....
(ten *or* tenth *or* hundredth *or* unit)

[c] $\frac{3}{8}$ .... 0.35 (> *or* < *or* =)

[d] 47.325 × 10 .... 4.7325 × 100 (< *or* = *or* >)

[e] 426.305 ≃ .... (to the nearest hundredth)
(400 *or* 426.30 *or* 426.31 *or* 426.305)



3 **Complete each of the following :** (5)

[a] 35.61 × 0.1 = ...



[b] 12.5 + 7.632 = ... ≃ .... (to the nearest $\frac{1}{100}$)



[c] 5.37 × 5 = ... ≃ .... (to the nearest tenth)



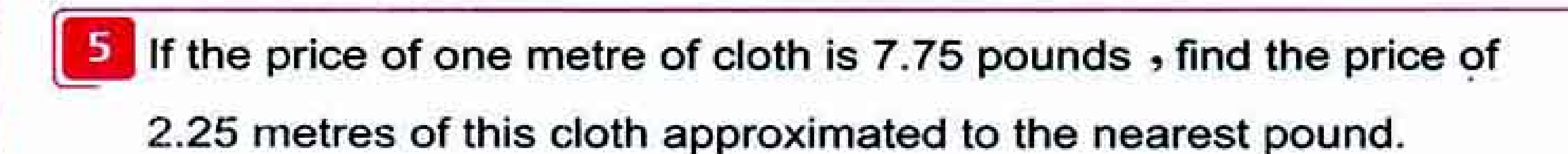
[d] 7.3 m. = ... dm.

[e] 45.278 – 28.3451 = ... ≃ .... (to the nearest 0.001)

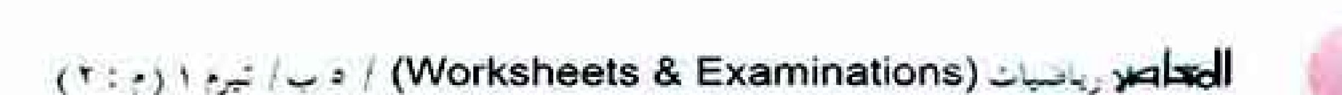




4 Find the area of the rectangle , its dimensions are 2.4 cm. and 4.5 cm. approximating the result to the nearest unit. (3)



5 If the price of one metre of cloth is 7.75 pounds , find the price of 2.25 metres of this cloth approximated to the nearest pound. (2)









Sheet 5

From lesson 1 unit 1 to lesson 5 unit 1

Total mark 20

1 Find the result of each of the following : (5)

[a] $\frac{1}{2} \times \frac{4}{5}$ = ...

[b] $16 \times \frac{5}{8}$ = ...

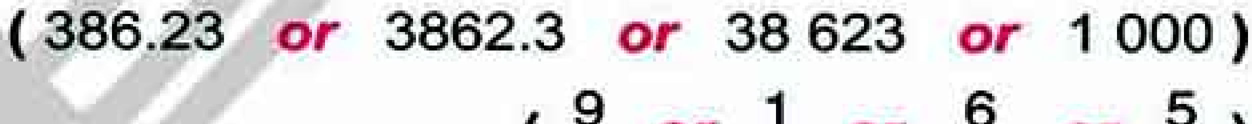
[c] $3\frac{2}{5} \times 4\frac{1}{2}$ = ...

[d] 3.5 × 0.5 = ...

[e] 37.59 × 100 = ...

2 Choose the correct answer : (5)

[a] 38.623 litres = ... mL.



(386.23 or 3862.3 or 38 623 or 1 000)

[b] $\frac{3}{4} \times 1\frac{1}{2}$ = ... ($\frac{9}{8}$ or $\frac{1}{2}$ or $\frac{6}{10}$ or $\frac{5}{4}$)

[c] $1\frac{3}{7}$ .... $1\frac{4}{7}$ (> or < or =)

[d] 93.4987 ≃ .... to the nearest thousandth.

(93.40 or 93.50 or 93.499 or 93.5)

[e] If $\frac{6}{13} < \frac{x}{13} < \frac{8}{13}$, then x = ... (6 or 7 or 8 or 13)

3 Complete each of the following : (5)

[a] $1\frac{1}{5} \times 2\frac{1}{3}$ = ...

[b] 3.52 × 7.4 = ...



[c] 3.5 km. = ... m.



[d] $2\frac{3}{8}$ ≃ .... (to the nearest 2 decimal places)

[e] $3\frac{1}{4} \times \frac{4}{13}$ = ...

4 (3)

[a] Arrange the following numbers in a descending order :



$\frac{1}{2}$, $\frac{7}{8}$, 1 and $\frac{2}{5}$



[b] Put (>) , (<) or (=) :

(1) $2\frac{1}{4}$ ☐ $\frac{7}{3}$

(2) 5.73 × 100 ☐ 57 300



5 (2)

The price of a bar of chocolate is L.E. $2\frac{3}{4}$

What is the cost of 15 bars of the same kind ?

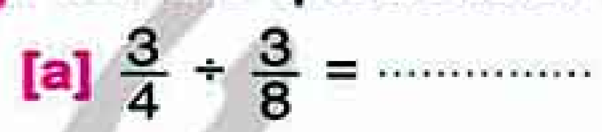




Sheet 6

From lesson 1 unit 1
to lesson 6 unit 1





1 **Find the quotient of each of the following :** (5)

[a] $\frac{3}{4} \div \frac{3}{8}$ = ...

[b] $\frac{2}{5} \div \frac{7}{10}$ = ...

[c] $8 \div \frac{4}{9}$ = ...

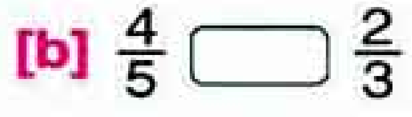
[d] $1\frac{3}{4} \div \frac{1}{2}$ = ...

[e] $6\frac{1}{4} \div 12\frac{1}{2}$ = ...



2 **Put (>) , (<) or (=) :** (5)

[a] $\frac{3}{4}$ of an hour ☐ 40 minutes.



[b] $\frac{4}{5}$ ☐ $\frac{2}{3}$

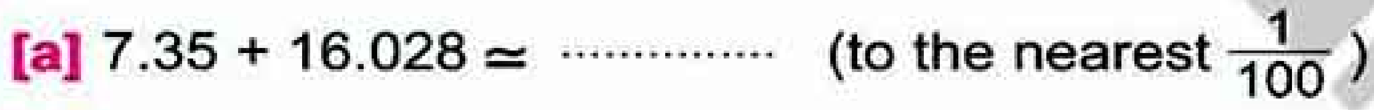
[c] $7 \times \frac{1}{3}$ ☐ $2\frac{1}{3}$

[d] $2\frac{1}{2} \div 4$ ☐ $\frac{7}{8}$

[e] 3.2 kg. ☐ 3 200 gm.

3 **Complete the following :** (5)

[a] 7.35 + 16.028 ≃ .... (to the nearest $\frac{1}{100}$)



[b] 2.56 m. = ... cm.



[c] 2.3 × 1.1 = ...

[d] $\frac{2}{15} \times \frac{5}{6}$ = ...

[e] $\frac{2}{5} \div 3$ = ...

4 The perimeter of a square is $\frac{8}{11}$ m. (3)

Find the side length of the square.



5 Ahmed bought a piece of cloth 4.2 metres long , if the price of one metre is 48.7 pounds. Calculate the price of the cloth approximating the result to the nearest pound. (2)







Sheet 7



1 Complete the following : (5)

[a] $8.4 \div 10 =$ ....

[b] $3.6 \div 100 =$ ....

[c] $2456.8 \div 1\,000 =$ ....

[d] 372.5 gm. = ... kg.

[e] 5 629 m. $\simeq$ .... km. (to the nearest km.)

2 Choose the correct answer : (5)

[a] $4.617 \times$ .... $= 4\,617$ (10 or 100 or 1 000 or 0.1)

[b] $\frac{5}{9}$ .... $\frac{7}{11}$ (> or < or =)

[c] 9.612×100 .... $9\,612 \div 100$ (> or < or =)

[d] $\frac{2}{3} \times \frac{9}{8} =$ .... ($\frac{3}{4}$ or $\frac{4}{3}$ or 3 or $\frac{1}{4}$)

[e] $1\frac{1}{2} \div \frac{1}{4} =$ .... (2 or 6 or $\frac{3}{8}$ or 12)

3 Arrange the following numbers ascendingly : (4)

$\frac{11}{12}$, $\frac{5}{12}$, $\frac{3}{4}$, $\frac{2}{3}$ and $\frac{5}{6}$

4 (3)

A road is of length 64 983 m. Find its length in kilometres approximating the result to the nearest hundredth.



5 (3)

If L.E. 565.5 is distributed among 10 poor persons.
How much money did each one take ?






Sheet 8

From lesson 1 unit 1
to lesson 8 unit 1

تفوقك في أي مذكرة عليها العلامة دي
www.facebook.com/groups/zakrolypr5

Total mark 20

1 Find the result : (3)

[a] 3 968 ÷ 124 = ...

[b] 5 160 ÷ 215 = ...

[c] 19 968 ÷ 256 = ...



2 Choose the correct answer : (5)

[a] 6 020 ÷ 215 = ... (34 or 32 or 28 or 26)

[b] 0.342 × 1.2 .... 3.42 × 0.12 (< or = or >)

[c] $1\frac{3}{7}$ .... $1\frac{5}{11}$ (< or = or >)

[d] $9\frac{1}{3} \times \frac{6}{7}$ = ... (8 or $\frac{1}{8}$ or $\frac{8}{21}$ or $2\frac{2}{3}$)

[e] 8 120 ÷ 145 = ... (58 or 56 or 54 or 52)



3 Complete the following : (5)

[a] The number 14.669 ≃ .... (to the nearest hundredth)

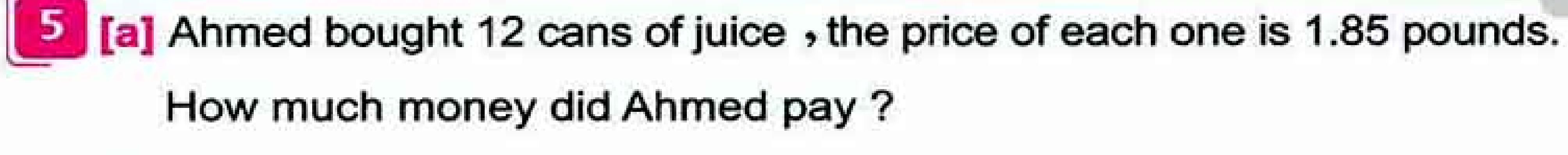
[b] 3.2 kg. = ... gm.

[c] 1 845 ÷ 123 = ...

[d] 0.97 × 0.05 = ...

[e] 75.351 ÷ 100 = ...

4 A truck can carry 162 boxes. Find the number of trips needed to transport 19 440 boxes. (3)



5 [a] Ahmed bought 12 cans of juice , the price of each one is 1.85 pounds. How much money did Ahmed pay ? (4)



[b] Arrange the following in an ascending order :

0.6 , $\frac{5}{8}$, $\frac{2}{5}$ and 0.5








From lesson 1 unit 1
to lesson 9 unit 1

1 Complete the following : (5)



[a] $16.4 \div 0.4 =$ ....

[b] $73.92 \div 2.31 =$ ....

[c] $17.5 \div 1.25 =$ ....

[d] $74.632 \times 100 =$ ....

[e] $56.431 + 2.115 =$ .... $\simeq$ .... (to the nearest hundredth)

2 Choose the correct answer : (5)

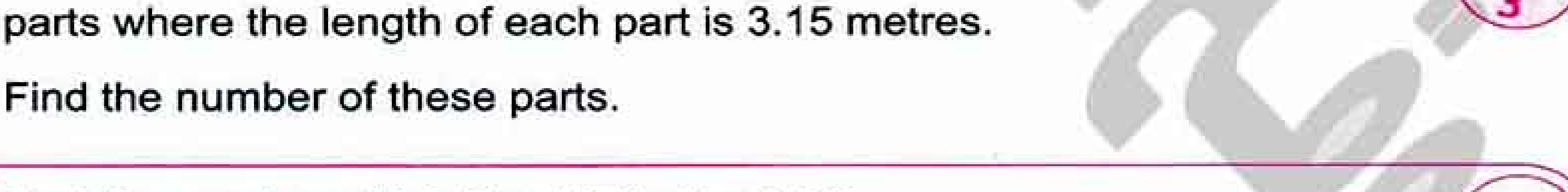
[a] 8.46 dm. = ... cm. (846 or 0.846 or 84.6 or 8 460)

[b] 172×0.003 .... 0.172×0.3 (< or = or >)

[c] $2\frac{1}{3}$ .... $\frac{7}{3}$ (< or = or >)

[d] $18.2 \div 1.3 =$ .... (13 or 14 or 15 or 16)

[e] $54.5 \div 0.5 =$ .... (1.9 or 1.09 or 19 or 109)



3 The length of a roll of cloth is 53.55 metres. It was divided into equal parts where the length of each part is 3.15 metres. (3)
Find the number of these parts.



4 Find the number which if multiplied by 0.52 the result will be 1.248 (3)

5 Find the area of the rectangle whose length is 13.25 cm. and its width is 6.14 cm. , then approximate the result to the nearest hundredth. (4)







From lesson 1 unit 1
to lesson 10 unit 1

1 **Find the result :** (4)

[a] $17 \div 6$ (approximated to the nearest tenth)

[b] $23 \div 7$ (approximated to the nearest $\frac{1}{100}$)

[c] $12.7 \div 3$ (approximated to the nearest hundredth)

[d] $12.34 \div 0.9$ (approximated to the nearest $\frac{1}{10}$)

2 **Choose the correct answer :** (5)

[a] $\frac{1}{25} \times 50 \times 0.25 =$ .... (4 or $\frac{1}{4}$ or $\frac{1}{2}$ or 2)

[b] $6.28 \div 0.4 =$ .... (15.7 or 157 or 1.57 or 0.157)

[c] $2\frac{1}{4} \times 2\frac{2}{3} =$ .... (6 or 3 or $\frac{2}{3}$ or $2\frac{1}{4}$)

[d] 7.4 .... $7\frac{5}{8}$ (> or < or =)

[e] $7.8 \div 0.6 =$ .... (10 or 11 or 13 or 14)

3 **Complete the following :** (5)

[a] 39 days ≃ .... weeks. (to the nearest week)

[b] $\frac{2}{11} \simeq$ .... (to the nearest tenth)

[c] $2\frac{1}{3} \div 1\frac{2}{7} =$ ....

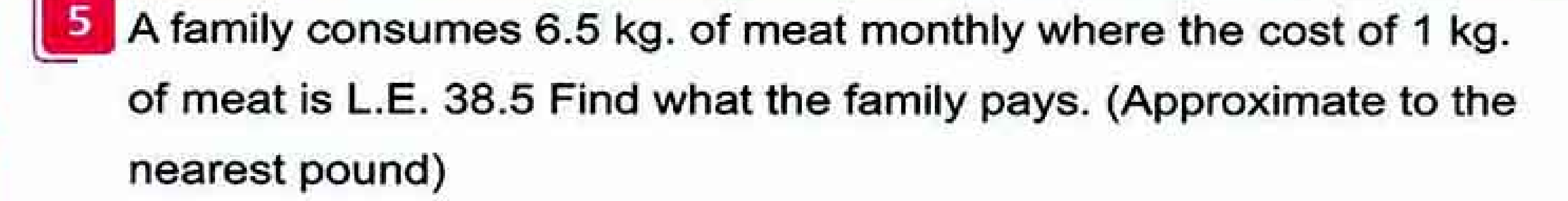
[d] $25.2 \div 0.3 =$ ....

[e] $45.337 \times 10 =$ ....

4 **Arrange the following ascendingly :**



$3\frac{1}{2}$, $4\frac{1}{4}$, $3\frac{3}{4}$, $3\frac{1}{8}$ and $3\frac{2}{5}$



5 A family consumes 6.5 kg. of meat monthly where the cost of 1 kg. of meat is L.E. 38.5 Find what the family pays. (Approximate to the nearest pound)







From lesson 1 unit 1
to lesson 1 unit 2



1 **State which of the following is a set and which is not a set :**



[a] The colours of the Egyptian flag.

[b] The letters in the word "Egypt".

[c] Beautiful cities in Egypt.

[d] Intelligent pupils in your class.

[e] Days of the week.

2 **Write the elements of the following sets :**



[a] The set of digits of the number 74 581

[b] The set of letters of the word "student".

[c] The whole numbers between 5 and 10

[d] The even numbers less than 10

[e] The factors of 6

3 **Complete each of the following :**



[a] $12\frac{1}{2} \times \frac{4}{5} =$ ....

[b] $45.334 \times 100 =$ ....

[c] $25.25 \div 0.25 =$ ....

[d] $72.358 \simeq$ .... (to the nearest hundredth)

[e] $7.2 \times 5.2 =$ ....

4 A building consists of 7 floors. If the height of each floor is 3.05 metres , find the height of the building.



5 **Arrange the following in a descending order :**



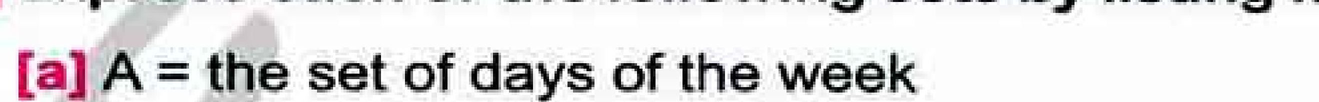
$$\frac{1}{4} , \frac{4}{5} , \frac{1}{2} , 0.4 \text{ and } \frac{3}{4}$$







From lesson 1 unit 1
to lesson 2 unit 2



1 **Express each of the following sets by listing method :** (5)

[a] A = the set of days of the week

[b] B = the set of digits of the number 32323

[c] C = the set of letters of the word "door"

[d] D = the set of prime numbers less than 10

[e] E = the set of even numbers between 7 and 17

2 **Express each of the following sets by description method :** (5)



[a] A = {Port Said , Ismailia , Suez}

[b] B = {1 , 3 , 5} [c] C = {11 , 13 , 17}

[d] D = {9 , 10 , 11 , 12} [e] E = {o , a , g , l}

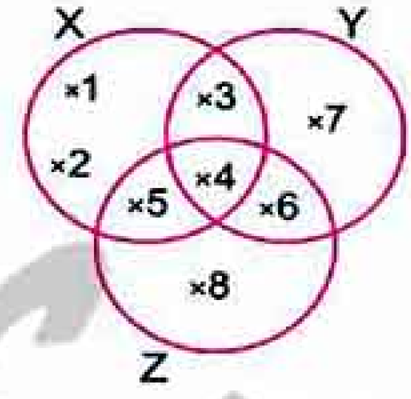
3 **Using the Venn diagram below , list the elements of each of the following :** (5)



[a] X = ...

[b] Y = ...

[c] Z = ...



[d] The set of the elements found in X and Y = ...

[e] The set of the elements found in X , Y and Z = ...

4 **Complete each of the following :** (3)

[a] 43 days ≃ .... weeks (to the nearest week)

[b] 2.576 m. = ... cm.

[c] If $\frac{1}{3} = \frac{a}{15}$, then a = ...

[d] 1.23 × 0.6 = ... ≃ .... (to the nearest hundredth)

[e] $2\frac{1}{3} \div \frac{5}{6}$ = ...

5 If the price a piece of sweet is 4.35 pounds , what is the price of 35 pieces of the sweet ? (2)









Sheet 13

From lesson 1 unit 1 to lesson 3 unit 2

1 **If A = {2 , 5 , 6 , 7} and B = {0 , 1 , 5 , 6} , put the suitable sign of (∈ or ∉) :**



[a] 6 ………… A , 6 ………… B

[b] 2 ………… A , 2 ………… B

[c] 1 ………… A , 1 ………… B

[d] 5 ………… A , 5 ………… B

[e] 65 ………… A , 65 ………… B

2 **State if each set is finite , infinite or empty :** (5)

[a] The set of whole numbers lying between 3 and 4 (……………)

[b] The set of pupils in your school. (……………)

[c] The set of even numbers. (……………)

[d] The set of prime numbers between 1 and 3 (……………)

[e] The set of dinosaurs in the zoo. (……………)

3 **Choose the correct answer :**



[a] The smallest fraction in the following is ……………

($\frac{1}{3}$ or $\frac{5}{8}$ or $\frac{2}{9}$ or $\frac{2}{5}$)

[b] $\frac{1}{2}$ …………… $\frac{1}{3}$ (> or = or <)

[c] The quotient of dividing 1.92 ÷ 0.6 = ……………

(3.5 or 3.1 or 3.2 or 3)

[d] 28.9316 ≃ …………… (to the nearest thousandth)

(29 or 28.93 or 28.931 or 28.932)



4 **Complete each of the following :**

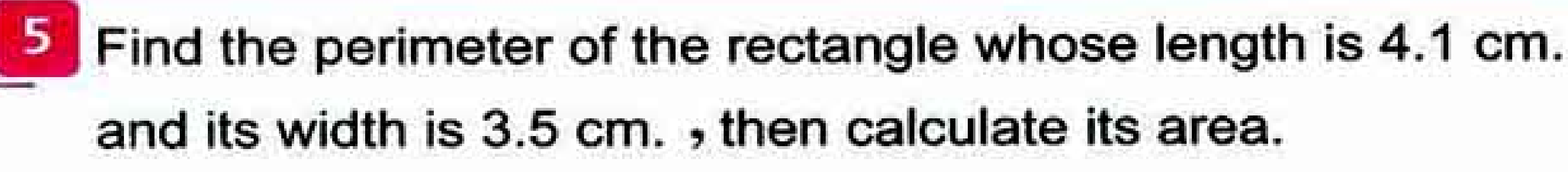


[a] If 3 ∈ {2 , x , 5} , then x = ……………

[b] If 5 ∈ {3 , x + 4} , then x = ……………

[c] If 8 ∈ {7 , 5 , x – 1} , then x = ……………

[d] $5\frac{5}{8}$ ≃ …………… (to the nearest two decimal places)



5 Find the perimeter of the rectangle whose length is 4.1 cm. and its width is 3.5 cm. , then calculate its area.







Sheet 14



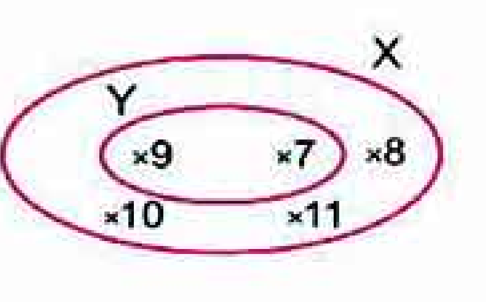
Total mark 20

From lesson 1 unit 1
to lesson 4 unit 2



1 Using the opposite Venn diagram , complete using ($\in$, $\notin$, $\subset$ or $\not\subset$) : (4)

[a] Y X
[b] 8 X
[c] {10} X
[d] 11 .... Y
[e] $\varnothing$ X
[f] {9 , 11} .... Y
[g] Y .... {10 , 11 , 9 , 7}
[h] X .... Y





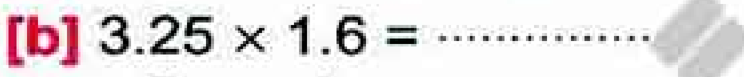


2 Write down all the subsets for each of the following sets : (4)

[a] {5 , 7}
[b] {3 , 4 , 8}

3 Complete each of the following : (5)

[a] If {5 , 3 , 1} = {x , 5 , 1} , then x = ...
[b] 3.25 × 1.6 = ...
[c] $9\frac{3}{4} \div 3\frac{1}{4}$ = ...
[d] If {7 , 10} $\subset$ {2 , 10 , x} , then x = ...
[e] 70 hours $\simeq$ .... days. (to the nearest day)



4 Choose the correct answer : (5)

[a] {7} .... {17 , 77} ($\in$ or $\notin$ or $\subset$ or $\not\subset$)
[b] 7 .... the set of days of the week. ($\in$ or $\notin$ or $\subset$ or $\not\subset$)
[c] $\varnothing$ .... {3 , 4 , 6} ($\in$ or $\notin$ or $\subset$ or $\not\subset$)
[d] 135.42 ÷ 100 = ...
(13 542 or 13.542 or 1.3542 or 1354.2)
[e] {1 , 2 , 3 , 4 , ...} is .... set.
(a finite or an infinite or an empty)





5 A worker earns L.E. $2\frac{1}{2}$ per hour. (2)
How many hours does he work to earn L.E. $8\frac{3}{4}$?



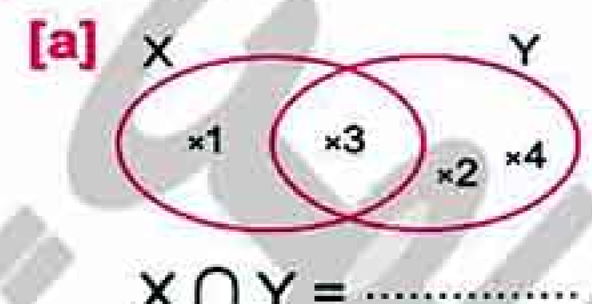




From lesson 1 unit 1
to lesson 5 unit 2

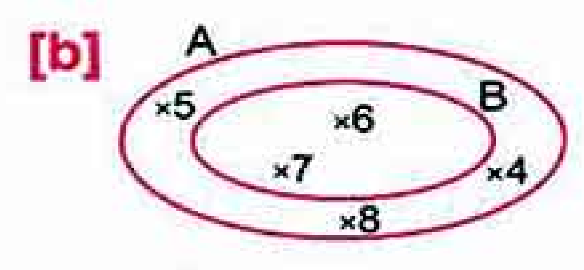
1 **Complete the following :** (4)

[a]



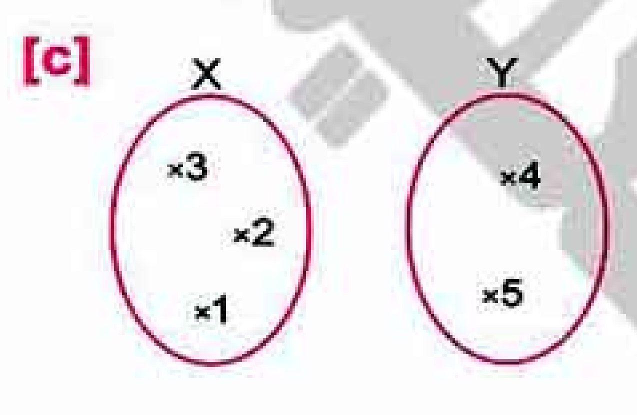
$X \cap Y =$ ....

[b]



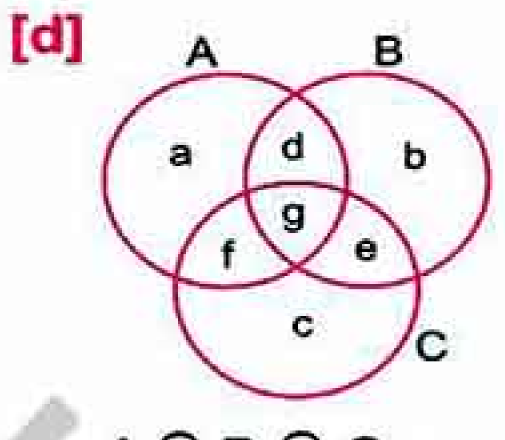
$A \cap B =$ ....

[c]



$X \cap Y =$ ....

[d]



$A \cap B \cap C =$ ....

2 **Complete the following :** (5)



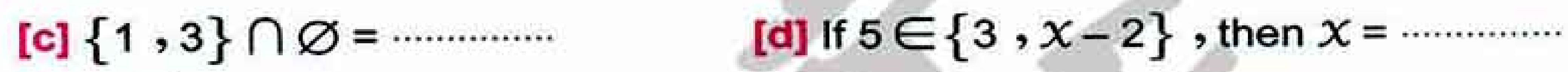
[a] $\{1, 2\} \cap \{2, 4\} =$ ....

[b] $\{1, 3\} \cap \{5\} =$ ....

[c] $\{1, 3\} \cap \varnothing =$ ....

[d] If $5 \in \{3, x - 2\}$, then $x =$ ....

[e] $39\frac{2}{5} - 7.25 =$ .... $\simeq$ .... (to the nearest unit)



3 **Choose the correct answer :** (5)

[a] $6.352 \times 100 =$ .... (63.52 *or* 635.2 *or* 6 352 *or* 63 520)

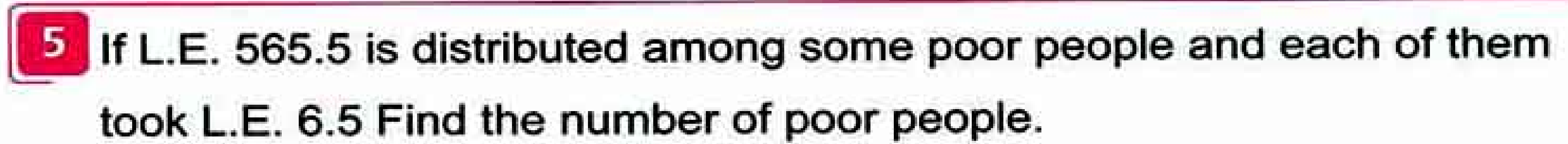
[b] $0.03 \times 3.6 =$ .... (0.108 *or* 1.08 *or* 10.8 *or* 0.0108)

[c] 2 .... $\{11, 22, 33\}$ ($\in$ *or* $\notin$ *or* $\subset$ *or* $\not\subset$)

[d] 1 .... $\{2, 1, 4\} \cap \{3, 4, 1\}$ ($\in$ *or* $\notin$ *or* $\subset$ *or* $\not\subset$)

[e] $\{a, b\}$ .... $\{a, b, c\} \cap \{a, c, d\}$ ($\in$ *or* $\notin$ *or* $\subset$ *or* $\not\subset$)

4 **Find the result of each of the following :** (4)





[a] $4\frac{1}{4} \div 8\frac{1}{2}$

[b] 6.217×100

[c] $11\ 664 \div 216$

[d] $\frac{2}{11}$ approximated to the nearest tenth.

5 If L.E. 565.5 is distributed among some poor people and each of them took L.E. 6.5 Find the number of poor people. (2)





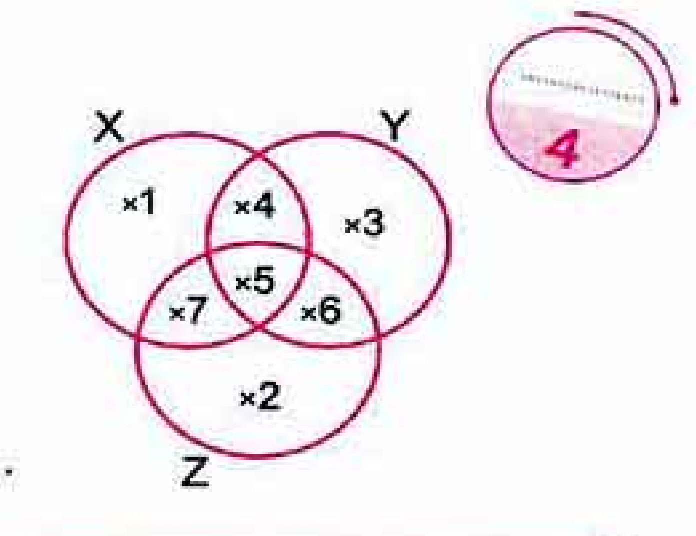


Sheet 16



From lesson 1 unit 1 to lesson 6 unit 2

1 **Using the opposite Venn diagram , complete :** (4)



[a] X = ... [b] Y = ...

[c] Z = ... [d] X ∪ Y = ...

[e] X ∪ Z = ... [f] Z ∪ Y = ...

[g] X ∪ Y ∪ Z = ... [h] X ∩ Y ∩ Z = ...

2 **Choose the correct answer :** (5)

[a] {1 , 9} .... the set of odd numbers. (∈ or ∉ or ⊂ or ⊄)

[b] 62.5 ÷ 2.5 = ... (25 or 35 or 700 or 45)

[c] 20.379 ≃ .... (to the nearest hundredth) (20 or 20.37 or 20.4 or 20.38)

[d] ∅ .... {0} (= or ⊂ or ⊄ or ∈)

[e] If X ⊂ Y , then X ∩ Y = ... (X or Y or ∅ or {0})

3 **Complete the following :** (5)



[a] If 4 ∈ {6 , x , 9} , then x = ...

[b] If X = {3 , 4} , Y = {3 , 5} , then X ∪ Y = ...

[c] 3.56 km. = ... m.

[d] 0.45 × 0.6 = ...

[e] 753.81 ÷ 100 = ...

4 [a] Find the value of x if : $\frac{1}{4} = \frac{3}{x}$ (4)



[b] **Arrange ascendingly :** 0.8 , $\frac{3}{8}$, $\frac{3}{4}$ and 0.6

5 If the price of one kg. of apple is 9.75 pounds. (2)



Find the price of 2.5 kg.





Sheet 17



Total mark 20

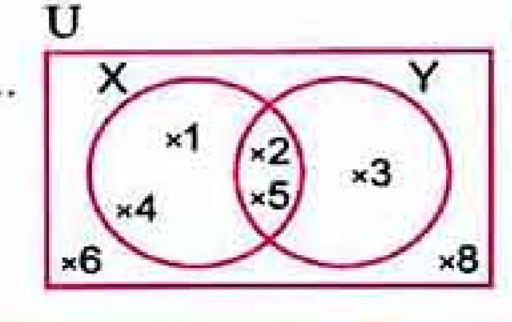


From lesson 1 unit 1



to lesson 7 unit 2

1 **Using the opposite Venn diagram , complete :** (5)



[a] U = ...

[b] $X \cap Y$ = ...

[c] $X \cup Y$ = ...

[d] $\grave{X}$ = ...

[e] $\grave{Y}$ = ...

2 If A = {1 , 2 , 3} , B = {2 , 3 , 5} , U = {1 , 2 , 3 , 4 , 5 , 6} , represent A , B and U by a Venn diagram , then find : (3)



[a] $\grave{A}$

[b] $\grave{B}$

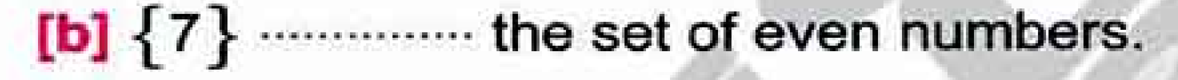
[c] $A \cap B$

[d] $A \cup B$

3 **Put the suitable sign of ($\in$, $\notin$, $\subset$ or $\not\subset$) :** (4)



[a] 12 .... {10 , 2}



[b] {7} .... the set of even numbers.

[c] 3 .... {33}

[d] {2 , 5 , 9} .... the set of prime numbers.

4 **Choose the correct answer :** (4)



[a] 10.57 ÷ 9 ≃ .... to the nearest hundredth.

(1.20 *or* 1.18 *or* 1.17 *or* 1.16)

[b] $2\frac{1}{4} \times 1\frac{2}{3}$ = ... ($4\frac{1}{4}$ *or* $3\frac{3}{4}$ *or* $3\frac{7}{12}$ *or* $2\frac{2}{12}$)

[c] Which set is not a subset of {g , h , f} ?

({f} *or* {f , g , h} *or* { } *or* {gh})

[d] $\{3 , 2 , 5\} \cap \{32 , 5\}$ = ...

({3 , 2 , 5} *or* {32 , 5} *or* {5} *or* {32})

5 **Find the result :** (4)

[a] 937.52 × 10

[b] 355 ÷ 33 (to the nearest thousandth)

[c] $7\frac{4}{5} \div 3\frac{1}{4}$

[d] 38.56 ÷ 100







From lesson 1 unit 1 to lesson 8 unit 2

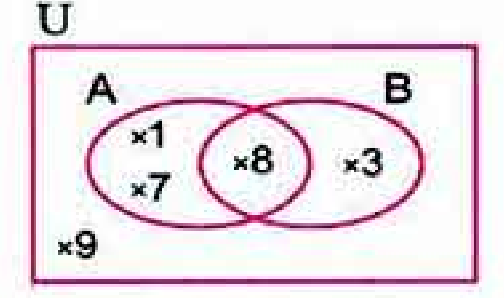
1 Using the opposite Venn diagram , list each of the following : (3)



[a] $A \cap B$ [b] $A \cup B$

[c] $A - B$ [d] $B - A$

[e] $\grave{A}$ [f] $\grave{B}$



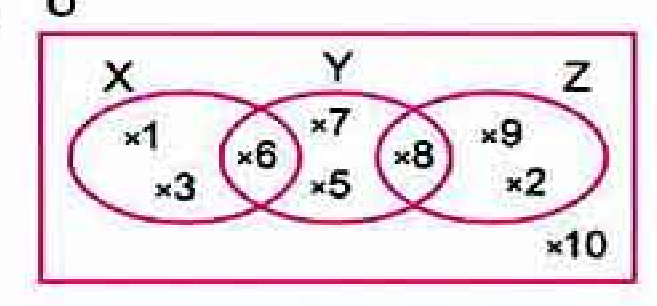
2 Using the opposite Venn diagram , find : (5)



[a] $X \cap Y$ [b] $Y \cup Z$

[c] $Z - Y$ [d] $\grave{X}$

[e] $X \cup Y \cup Z$





3 Complete the following : (5)



[a] $\{2, 3\} \cup \{3, 4\} =$ ....

[b] If $\{3, 5\} \subset \{3, 10, x\}$, then $x =$ ....

[c] $\{2, 4, 5\} - \{3, 4, 7\} =$ ....

[d] If $X \subset Y$, then $X - Y =$ ....

[e] $0.54 \times 1000 =$ ....

4 Choose the correct answer : (5)

[a] $\varnothing$ .... $\{3, 5\}$ ($\in$ or $\notin$ or $\subset$ or $\not\subset$)

[b] If $\{4, 7, x\} = \{1, 4, 7\}$, then $x =$ ....
(1 or 4 or 5 or 7)

[c] 45 days $\simeq$ .... weeks (to the nearest week)
(5 or 6 or 7 or 8)

[d] The greatest number in the following is ....
(0.111 or 0.12 or 0.123 or 1.023)

[e] The number of subsets of the set $\{4, 5\} =$ ....
(2 or 3 or 4 or 5)

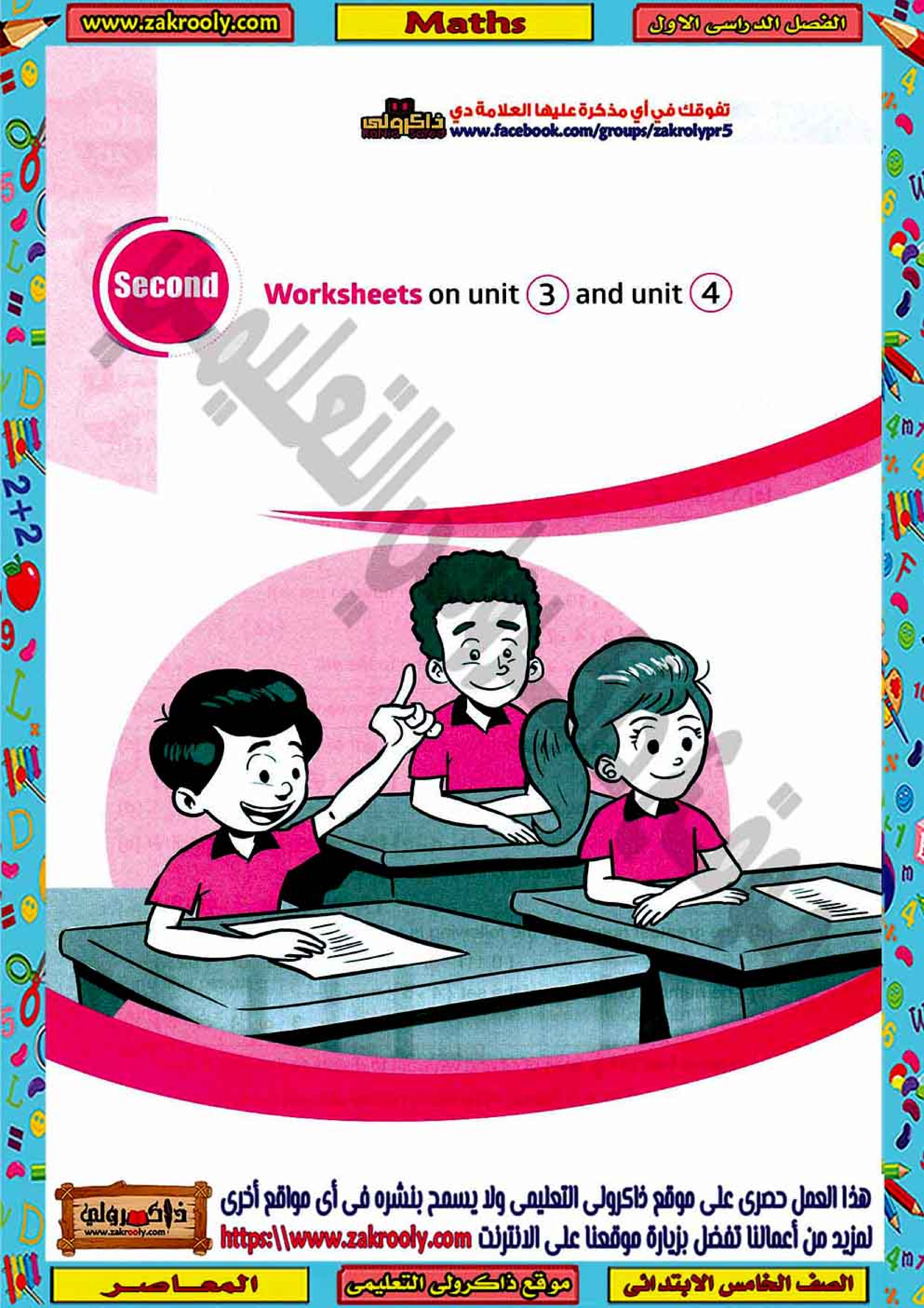
5 A big barrel has $131\frac{1}{4}$ litres of oil and we want to distribute the oil in bottles. The capacity of each is $5\frac{1}{4}$ litres. How many bottles are needed for that ? (2)





Second

Worksheets on unit 3 and unit 4



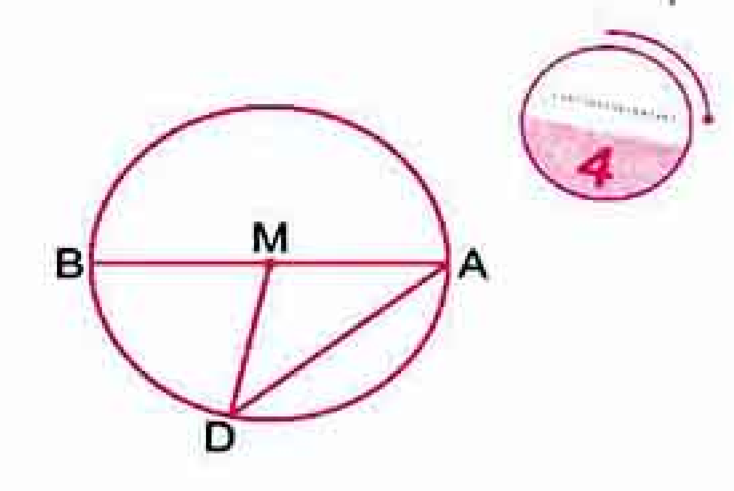




Sheet 1

On lesson 1 unit 3

1 In the opposite figure , complete : (4)



[a] $\overline{AB}$ is a .... in the circle.

[b] $\overline{AD}$ is a .... in the circle.

[c] $\overline{MB}$ is a .... in the circle.

[d] The point .... is the centre of the circle.

2 Complete the following : (4)

[a] The longest chord in the circle is called ....

[b] All radii in the same circle are ....

[c] A circle of radius length 7 cm. , then its diameter length = ... cm.

[d] The chord which passes through the centre of the circle is called ....

3 Draw a circle of centre M and radius length 3 cm. (4)

4 Draw a circle N with diameter length 8 cm. (4)



5 Draw the circle of centre M with radius length 5 cm. , draw the diameter $\overline{AB}$, then draw the chord $\overline{BC}$ with length 6 cm. , then draw $\overline{AC}$ and find its length. (4)











From lesson 1 unit 3 to lesson 2 unit 3

1 [a] Draw the triangle ABC in which AB = 7 cm. , BC = 5 cm. , AC = 6 cm.



[b] Draw a circle M of radius length 4 cm.

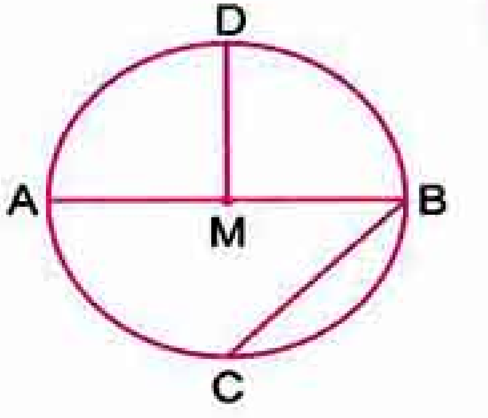
2 [a] Draw the equilateral triangle XYZ whose side length is 5 cm.



[b] From the opposite figure , complete :

(1) $\overline{BC}$ is called .... in the circle M

(2) If AB = 10 cm. , then MD = ... cm.



3 [a] Draw the triangle LMN in which LM = MN = 5 cm. and LN = 6 cm.



[b] Draw a circle M of radius length 5 cm. , then draw the diameter $\overline{AB}$ and the chord $\overline{AC}$ of the length 6 cm. Draw $\overline{BC}$ and find its length.

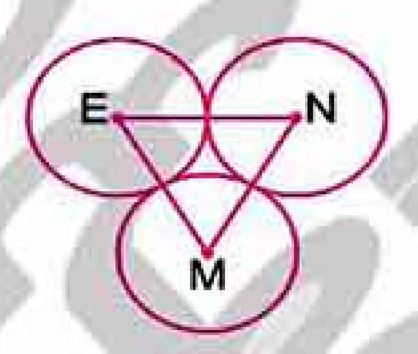
4 [a] Draw the triangle XYZ , such that XY = 3 cm. , YZ = 4 cm. and XZ = 5 cm.
What is the type of triangle XYZ according to the measures of its angles ?



[b] In the opposite figure :

Three circles of centres M , N and E of radius length 3 cm. for each.

Find the perimeter of △ MEN



5 [a] Draw the equilateral triangle ABC whose perimeter is 12 cm.

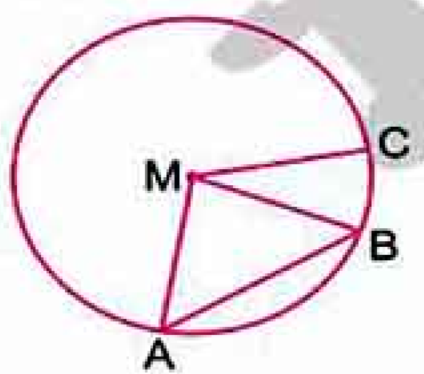


[b] From the opposite figure , complete :

(1) .... is a chord in the circle M



(2) m (∠ BAM) = m (∠ ....)







Sheet 3

From lesson 1 unit 3
to lesson 3 unit 3



1 Draw the triangle XYZ in which XY = 4 cm. , YZ = 5 cm. and ZX = 6 cm. , then draw its altitudes (Don't remove the arcs)



2 Draw the triangle ABC in which AB = BC = 5 cm. and AC = 8 cm. , then draw the altitude from B to $\overline{AC}$ and measure its length.



3 Draw the equilateral triangle ABC whose side length = 4 cm. , then draw $\overline{AD} \perp \overline{BC}$, find :



[a] m (∠ CAD)

[b] The length of $\overline{BD}$

[c] The perimeter of the triangle ABC



4 **Complete :**

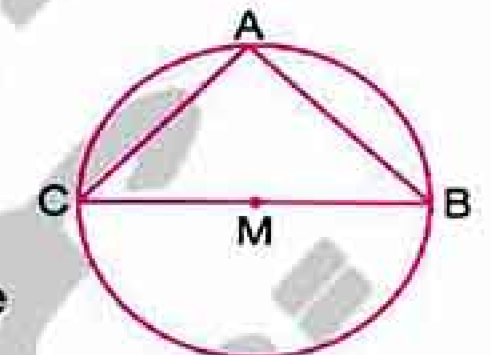
[a] To draw a circle of diameter length 12 cm. , then the opening distance of the compasses should be .... cm.



[b] The number of altitudes of the right-angled triangle is ....

[d] **In the opposite figure :**

The greatest chord in the circle M is ....



[d] The altitudes of the obtuse-angled triangle intersect at one point located .... the triangle.



5 Draw Δ ABC in which AB = 6 cm. , BC = 8 cm. and AC = 10 cm. , then draw $\overline{BD} \perp \overline{AC}$, find :



[a] m (∠ ABC)

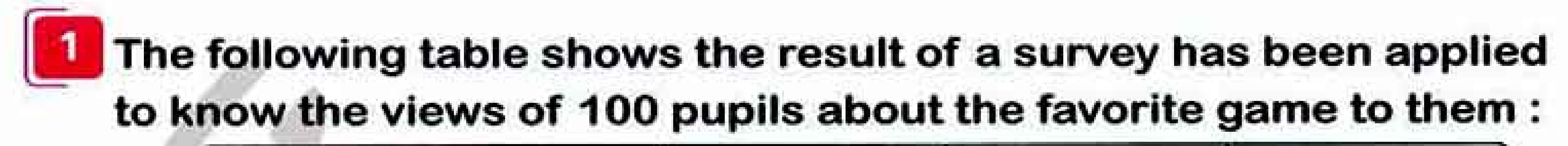


[b] The length of $\overline{BD}$









Sheet 4

From lesson 1 unit 3 to lesson 1 unit 4

1 **The following table shows the result of a survey has been applied to know the views of 100 pupils about the favorite game to them :** (5)

The game	Football	Handball	Basketball
The number of views	50	40	10

[a] If one pupil is chosen at random , answer the following questions :

(1) What is the probability that one of them prefers football ?

(2) What is the probability that one of them prefers handball ?

(3) What is the probability that one of them prefers basketball ?

[b] If there are 300 pupils , what is the expected value of the number of pupils who prefer football ?

[c] If there are 1000 pupils what is the expected value of the number of pupils who prefer basketball ?





2 Draw the triangle ABC in which AB = 5 cm. , BC = 5 cm. and AC = 6 cm. , then draw its altitude from B to $\overleftrightarrow{AC}$ and measure its length. (4)

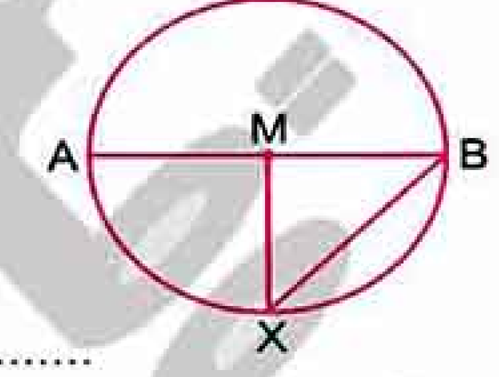


3 **Complete the following :** (4)

[a] The length of a diameter of a circle whose radius length is 4 cm. = ... cm.

[b] The number of altitudes of any triangle is ....

[c] **From the opposite figure :**



(1) The longest chord in the circle is ....
and it is called ....

(2) $\overline{XB}$ is called .... in the circle whose centre is ....



4 Draw a circle M of radius length 5 cm. , then draw the two radii $\overline{MA}$ and $\overline{MB}$ where m (∠ AMB) = 60° , then draw $\overline{AB}$ and find its length. (4)



5 Draw the equilateral Δ ABC in which its side length is 3 cm. , then find its perimeter. (3)





Sheet 5



Total mark 20

From lesson 1 unit 3
to lesson 2 unit 4

1 A box contains 4 white balls , 3 blue balls and 5 red balls , all of them are of equal size. When one ball is drawn randomly from the box , find the probability of :



[a] blue ball.
[b] red ball.
[c] not red ball.
[d] red or blue ball.

2 **Complete each of the following :**



[a] The probability of the certain event is ....
[b] Any chord passing through the centre of the circle is called a ....
[c] The number of altitudes of the scalene triangle is ....
[d] As throwing a metallic coin once , then the probability of a tail appears = ...

3 **Choose the correct answer :**



[a] It is .... that the lion flies. (sure or possible or impossible)
[b] A letter is selected randomly from the word «MARIAM» , then the probability of selecting the letter «M» is ....



($\frac{1}{3}$ or $\frac{1}{2}$ or $\frac{2}{5}$ or $\frac{1}{6}$)

[c] As throwing a fair die once and observing the apearing number on the upper face , then the probability of appearing an even number is .... ($\frac{1}{3}$ or $\frac{1}{2}$ or $\frac{5}{6}$ or $\frac{1}{6}$)
[d] The probability of the impossible event is .... ($\frac{1}{2}$ or $\frac{3}{4}$ or 1 or 0)

4 A card has been randomly drawn out of 10 cards numbered from 1 to 10 Find the probability of getting :



[a] an odd number.
[b] a prime number.
[c] a number less than 5
[d] a number divisible by 3

5 [a] Draw a circle M of diameter length 10 cm. , then draw the diameter $\overline{AB}$ and draw the chord $\overline{BC}$ whose length is 5 cm. and draw $\overline{AC}$, find m (∠ A)



[b] Draw the triangle ABC in which AB = 6 cm. and BC = AC = 5 cm. , then draw the altitude $\overline{CD}$ on $\overline{AB}$ and find its length.





SUMMARY OF FIRST TERM

Summary of Unit One

Approximating to the nearest hundredth and thousandth

First Approximating to the nearest hundredth "2 decimal places"

- **To approximate to the nearest hundredth , do as follows :**

Look at the digit written at the thousandth's place

IF

This digit is

Less than 5

Leave out the digit at the thousandth's place and the other digits to the right.

For Example :

28.342 ≃ 28.34

Equal to 5 or more

Increase the digit at the hundredth's place by one, and leave out other digits to the right.

For Example :

7.1271 ≃ 7.13

Second Approximating to the nearest thousandth "3 decimal places"

- **To approximate to the nearest thousandth , do as follows :**

Look at the digit written at the ten thousandth's place

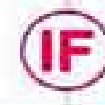
IF

This digit is

Less than 5

Leave out the digit at the ten thousandth's place and the other digits to the right.

For Example :



73.3421 ≃ 73.342

Equal to 5 or more

Increase the digit at the thousandth's place by one, and leave out other digits to the right.

For Example :

57.2408 ≃ 57.241



Comparing and ordering fractions

First Comparing two fractions of the same denominator

To compare any two fractions having the same denominator , compare their numerators , where the fraction with the greater numerator is greater than the other fraction.

For Example : $\frac{5}{9} > \frac{4}{9}$

Second Comparing two fractions of the same numerator

To compare any two fractions having the same numerator, compare their denominators , where the fraction with the smaller denominator is greater than the other fraction.

For Example : $\frac{3}{7} > \frac{3}{8}$

Third Comparing two fractions of different numerators and denominators

To compare two fractions of different numerators and denominators , do as follows :

1. **Put** each of the two fractions in its simplest form if it isn't.
2. **If** the numerators or the denominators of the two fractions after simplifying are equal , then compare between them as we have studied before.
3. **If** the numerators and the denominators of the two fractions are not equal, then express the two fractions by two other equal fractions with least common denominator L.C.D. by using L.C.M. of the two denominators.
4. **Compare** the two new fractions.



Fourth Comparing fractions and decimals

- To compare a fraction and a decimal, convert the decimal into fraction with denominator 10 , 100 , 1000 , . . . , then compare between the two fractions.

Multiplying decimals by 10 , 100 and 1000

- **To multiply by 10** , move the decimal point 1 place to the right.

  For Example : $2.5739 \times 10 = 25.739$

- **To multiply by 100** , move the decimal point 2 places to the right.

  For Example : $2.5739 \times 100 = 257.39$

- **To multiply by 1000** , move the decimal point 3 places to the right.

  $3.7 \times 1000 = 3700$

Multiplying decimals

For Example : To multiply : 2.45×0.7 , you can follow the following steps :

1. Ignore the decimal point to obtain two whole numbers 245 and 7
2. Multiply the two whole numbers : $245 \times 7 = 1715$
3. Add the numbers of decimal places in both initial numbers : $2 + 1 = 3$
4. Place the decimal point in the product : 1.715

2.45	⇨	2 decimal places
× 0.7	⇨	1 decimal place
1.715	⇨	3 decimal places

Multiplying fractions

First Multiplying two fractions

- **To multiply two fractions , do as follows :**
  1. Multiply the numerators of the two fractions to get the numerator of the product.
  2. Multiply the denominators of the two fractions to get the denominator of the product.
  3. Put the resulting fraction in its simplest form.

For Example :

$$\frac{1}{3} \times \frac{6}{7} = \frac{1 \times 6}{3 \times 7} = \frac{6}{21} = \frac{2}{7}$$

Another solution :

$$\frac{1}{\cancel{3}_1} \times \frac{\cancel{6}^2}{7} = \frac{1 \times 2}{1 \times 7} = \frac{2}{7}$$



Second Multiplying a whole number by a fraction

• **To multiply a whole number by a fraction , do as follows :**

1. Change the whole number to a fraction by placing it over a denominator of 1
2. Multiply the numerators.
3. Multiply the denominators.

For Example :

$$\frac{1}{6} \times 27 = \frac{1}{6} \times \frac{27}{1} = \frac{1}{\cancel{6}_2} \times \frac{\cancel{27}^9}{1} = \frac{1 \times 9}{2 \times 1} = \frac{9}{2} = 4\frac{1}{2}$$

Third Multiplying a mixed number by a fraction or a mixed number

• **To multiply a mixed number by a fraction or a mixed number , do as follows :**

1. Change the mixed number into an improper fraction.
2. Multiply the two fractions as shown in multiplying two fractions.

For Example :

$$1\frac{1}{4} \times \frac{3}{10} = \frac{\cancel{5}^1}{4} \times \frac{3}{\cancel{10}_2} = \frac{3}{8}$$

Dividing fractions

To divide a fraction by another fraction :
Exchange the numerator and the denominator of the second fraction **(the divisor)** , then multiply it by the first fraction.

For Example :

$$\frac{5}{7} \div \frac{4}{5} = \frac{5}{7} \times \frac{5}{4} = \frac{5 \times 5}{7 \times 4} = \frac{25}{28}$$

Dividing decimals by 10 , 100 and 1000

• **To divide by 10** , move the decimal point 1 place to the left.

For Example : $2573.9 \div 10 = 257.39$

• **To divide by 100** , move the decimal point 2 places to the left.

For Example : $73.9 \div 100 = 0.739$



- **To divide by 1000**, move the decimal point 3 places to the left.

  For Example: 2573.9 ÷ 1000 = 2.5739

Dividing a whole number by a 3-digit number without having a remainder

For Example:

- **To divide 19912 ÷ 152, do as follows:**

  When **dividing** by a 3-**digit** number, **start** with the **first three digits to the left**.

1. Divide 199 by 152, the result is 1 and the remainder is 47 because:
   1 × 152 = 152 & 199 − 152 = 47

```
        1
152 | 19912
     -152
       47
```

2. Drop 1, then divide 471 by 152, the result is 3 and the remainder is 15 because:
   3 × 152 = 456
   & 471 − 456 = 15

```
        13
152 | 19912
     -152↓
       471
     - 456
        15
```

3. Drop 2, then divide 152 by 152, the result is 1 and the remainder is 0

```
        131
152 | 19912
     -152
       471
     - 456↓
        152
     -  152
          0
```

Then, 19912 ÷ 152 = 131

Draft

You can use this draft to estimate the result of dividing by 152:

152 × 0 = 0
152 × (1) = 152 ← 199
152 × 2 = 304
152 × (3) = 456 ← 471
152 × 4 = 608

Note:

- 199 lies between 152 and 304
  So, we take 1 when dividing 199 by 152
- 471 lies between 456 and 608
  So, we take 3 when dividing 471 by 152

Dividing by a decimal

- **To divide by a decimal,** you can use the same way of dividing whole numbers, by writing the divisor as a whole number.

  Do this by **multiplying the divisor and the dividend by 10, 100, 1000,** ... ect.
  according to the number of places of the decimal part of the divisor.

For Example :

$$2.4 \div 1.2 = \frac{2.4 \times 10}{1.2 \times 10} = \frac{24}{12} = 2$$

Another solution :

$$2.4 \div 1.2 = 2.4 \div 1.2 = 2$$

Third solution :

$$2.4 \div 1.2 = \frac{24}{10} \div \frac{12}{10} = \frac{\cancel{24}^{2}}{{}_{1}\cancel{10}} \times \frac{\cancel{10}^{1}}{{}_{1}\cancel{12}} = 2$$

Infinite division

Sometimes, when we divide the numerator of a fraction by the denominator, we never reach a final digit.

For Example :

- **To divide 13 ÷ 123 approximating the quatient to the nearest hudredth , do as follows :**

```
        0.105
123 | 13.0
     - 12.3
       0.700
     - 0.615
       0.085
```

Then , $13 \div 123 \simeq 0.11$ to the nearest hundredth.



Summary of Unit Two

Mathematical expression of a set

First Listing method

For Example :

- The set of digits of the number 2010 = {2 , 0 , 1}

Second The description method

Example :

If X = {r , a , t} , then we can express the set X as one of the following :

- X = the set of letters of the word "rat".
- X = the set of letters of the word "art".

Types of sets

1 Finite set

A finite set is a set has a limited number of elements.
i.e. The number of its elements can be listed.

For Example :

- The set of names of the months of a year is finite because the number of its elements is 12

2 Infinite set

An infinite set is a set has an unlimited number of elements.
i.e. The number of its elements cannot be listed.

For Example :

- The set of even numbers = {0 , 2 , 4 , 6 , 8 , ...}

3 The null (empty) set

The null set is the set that has no elements.
It is denoted by symbol { } or ∅ which is read as "phi"

For Example :

- The set of your class pupils who visited the moon.

Equal sets

Two sets are equal if they **have the same elements exactly.**

For Example :

- If A = {a , b , c} and B = {a , c , b} , then **A = B**

Important symbols

The symbols ∈ ∉

∈ denotes "the **belonging** of an element to a set".
For Example : $2 \in \{5 , 2 , 3\}$

∉ denotes "the **not belonging** of an element to a set".
For Example : $6 \notin \{16 , 5 , 2\}$

The symbols ⊂ ⊄

⊂ denotes "the **subset** of a set to another set".
For Example : $\{5 , 2\} \subset \{2 , 3 , 5\}$

⊄ denotes "the **not subset** of a set to another set".
For Example : $\{5 , 0\} \not\subset \{5 , 8 , 7\}$

Remarks

1. The empty set ∅ is a subset of any set
   For Example : $\emptyset \subset \{a , b , c\}$, $\emptyset \subset \{1 , 2 , 3 , ...\}$, $\emptyset \subset \{0\}$
2. Any set is a subset of itself "$X \subset X$"
   For Example : $\{1 , 2\} \subset \{2 , 1\}$

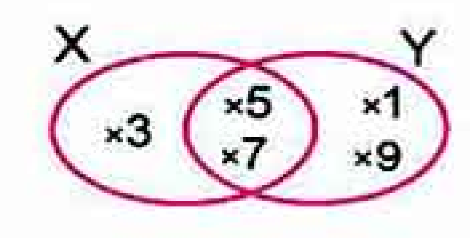


Intersection of two sets

The intersection of the two sets is the set of all common elements in the two sets. It is denoted by the symbol "∩"

For Example :

- If X = {3 , 5 , 7} , Y = {1 , 5 , 7 , 9} ,
  , then X ∩ Y = {5 , 7}

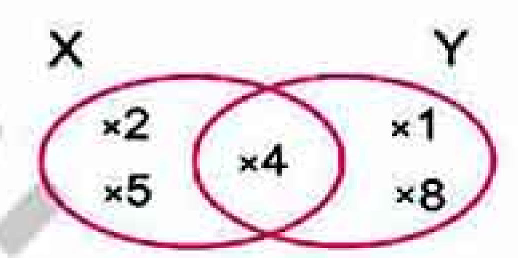


Union of two sets

The union of the two sets X and Y is that set which contains all the elements belonging to X or Y. It is denoted by the symbol "U"

For Example :

- If X = {2 , 4 , 5} and Y = {1 , 4 , 8}
  , then X ∪ Y = {2 , 4 , 5 , 1 , 8}



The universal set

The universal set is the mother set which includes all the given subsets. It is denoted by "U"

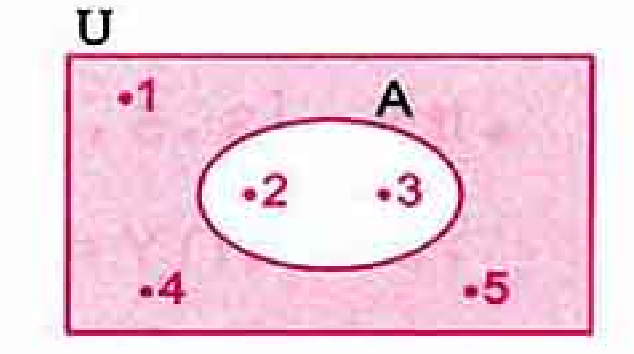
For Example :

- If X = {2 , 5 , 7} and Y = {3 , 4 , 5 , 6}
  , then the universal set U = the set of whole numbers less than 8
  "You can find other universal sets"



The complement of a set

If U is the universal set and A is a subset of U , then the complement of A is the set of elements in U but not in A



For Example :

- If $U = \{1, 2, 3, 4, 5\}$ and $A = \{2, 3\}$, then $\acute{A} = \{1, 4, 5\}$

Difference between two sets

X difference Y

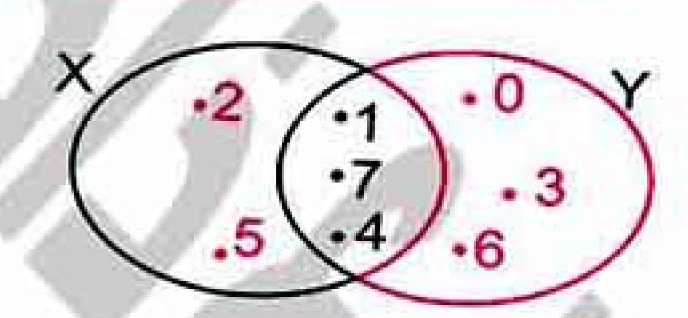
is the set of elements that belongs to X and does not belong to Y , it is written as "X − Y"

Y difference X

is the set of elements that belongs to Y and does not belong to X , it is written as "Y − X"

For Example :

- If $X = \{1, 2, 4, 5, 7\}$ and $Y = \{0, 1, 3, 4, 6, 7\}$, then :
- $X - Y = \{2, 5\}$
- $Y - X = \{0, 3, 6\}$



Notice

$X - Y \neq Y - X$

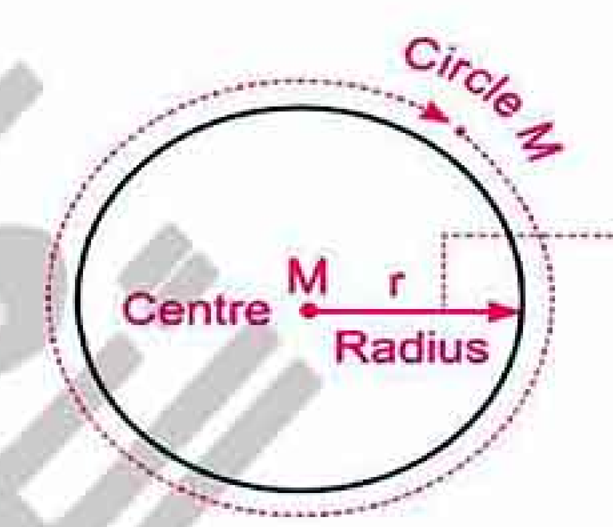


Summary of Unit Three

Circle

The **circle** is a closed curve , all the points on it having the same distance from a fixed point.

The fixed point is called the "centre" of the circle.



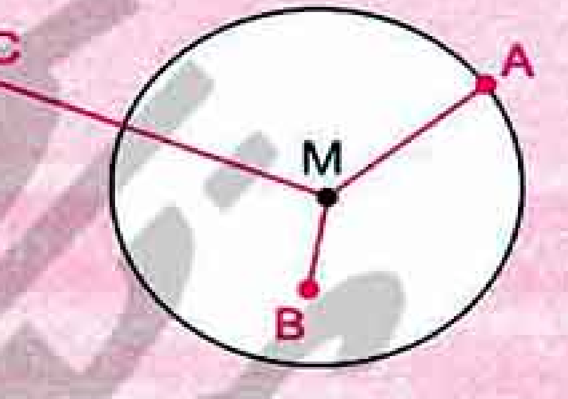
The constant distance is called the "radius length" of the circle , it is denoted by r

Remark

In the opposite figure :

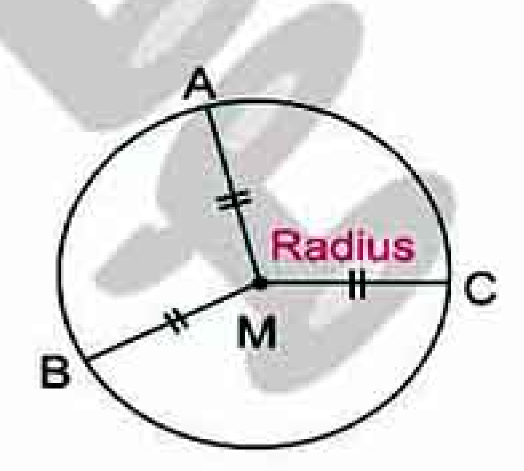
If M is a circle of radius r :

1. The point A is on the circle M (A ∈ circle M) , then :
   MA = r
2. The point B is inside the circle M , then :
   MB < r
3. The point C is outside the circle M , then :
   MC > r



The radius of a circle

The radius of a circle is a line segment whose endpoints are the centre of the circle , and any point on the circle.

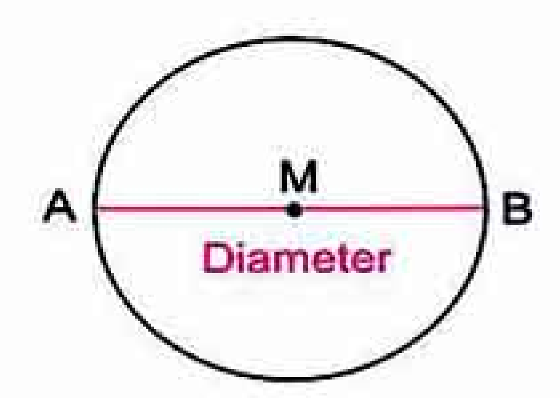


For Example :

Each of $\overline{MA}$, $\overline{MB}$ and $\overline{MC}$ is a radius of the circle M ,

MA = MB = MC

A chord in a circle



A chord in a circle is a line segment that connects between any two points on the circle.

For Example :
Each of $\overline{AB}$ and $\overline{CD}$ is a chord in the circle M

The diameter of a circle

The diameter of the circle is a chord that crosses the centre of the circle.

A M B
Diameter

For Example :
$\overline{AB}$ is a diameter in the circle M

Notice

- The diameter of the circle is the longest chord.
- The length of any diameter in a circle is equal to twice the length of its radius.

i.e. The length of the diameter = 2 × the length of the radius.

$$d = 2 \times r$$

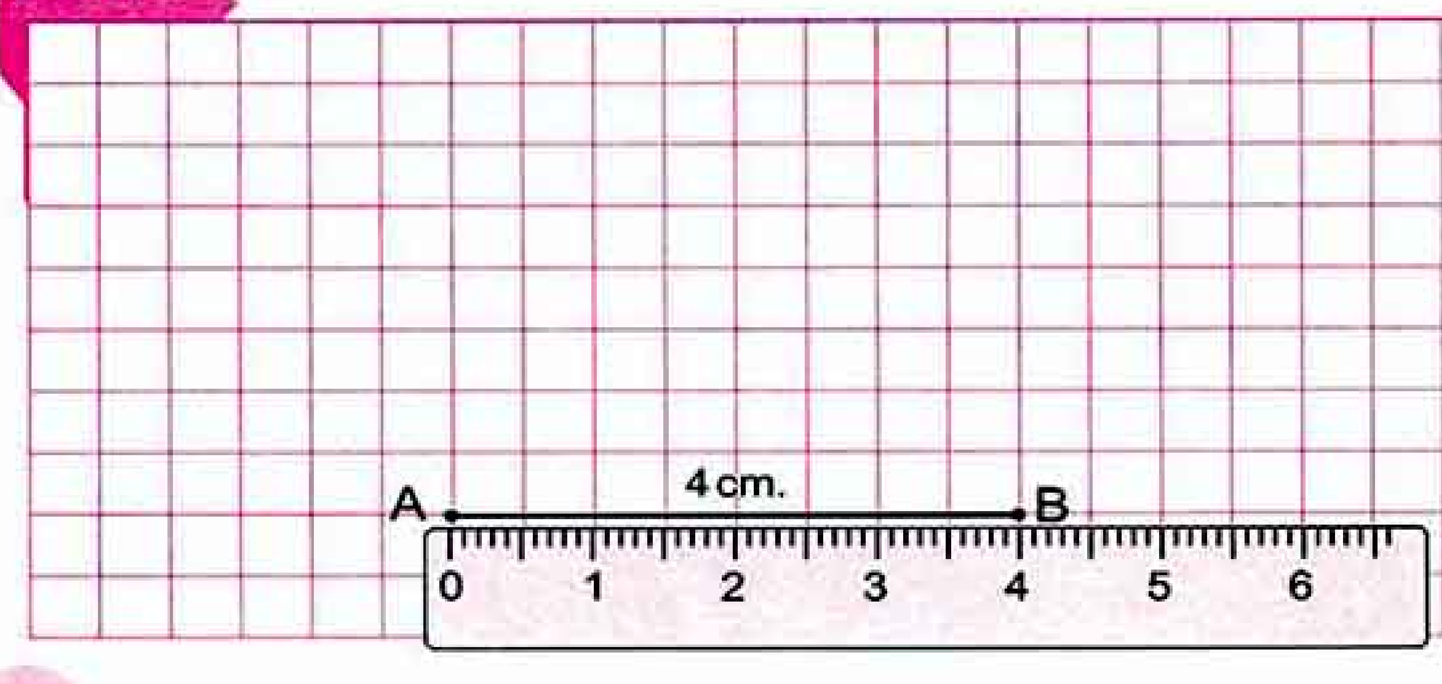
Drawing a triangle given the lengths of its three sides

Example

Draw the triangle ABC in which AB = 4 cm. , BC = 3 cm. and CA = 2 cm.

Solution

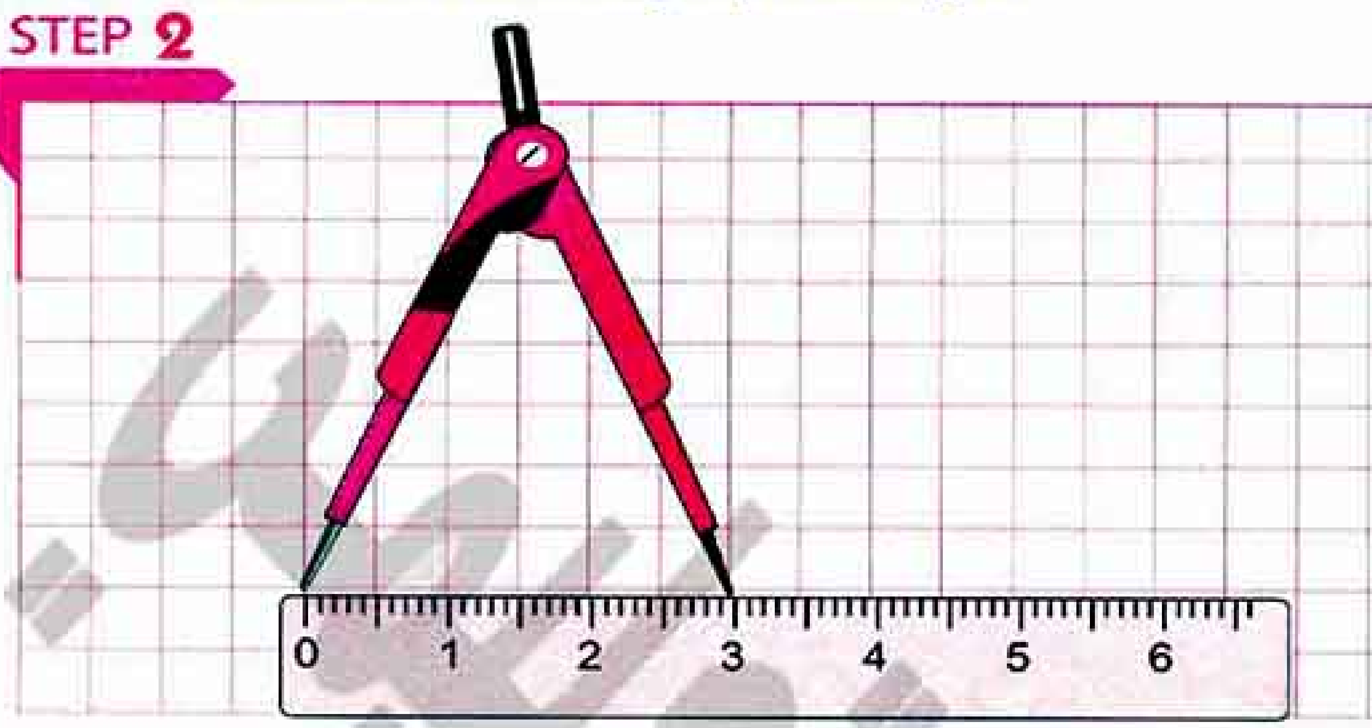
STEP 1



Use the ruler to draw the line segment $\overline{AB}$ of length 4 cm.

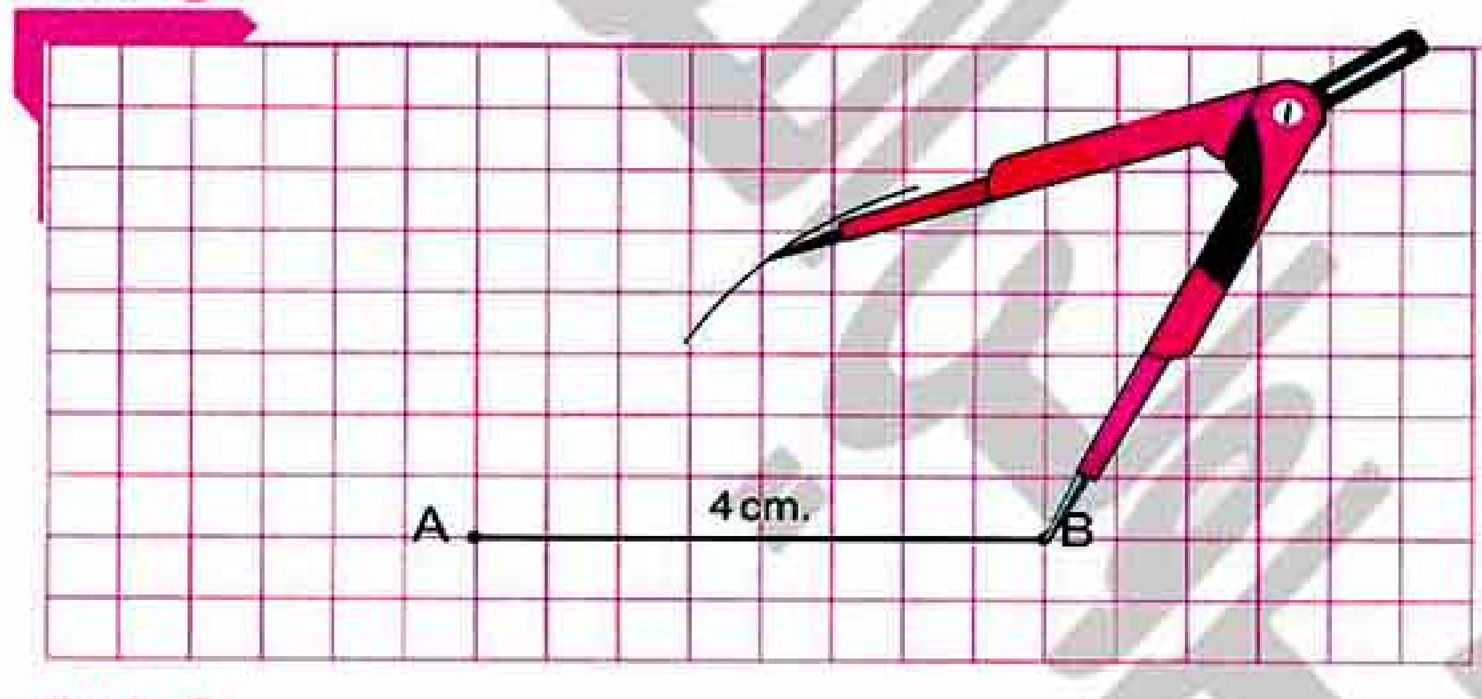


STEP 2



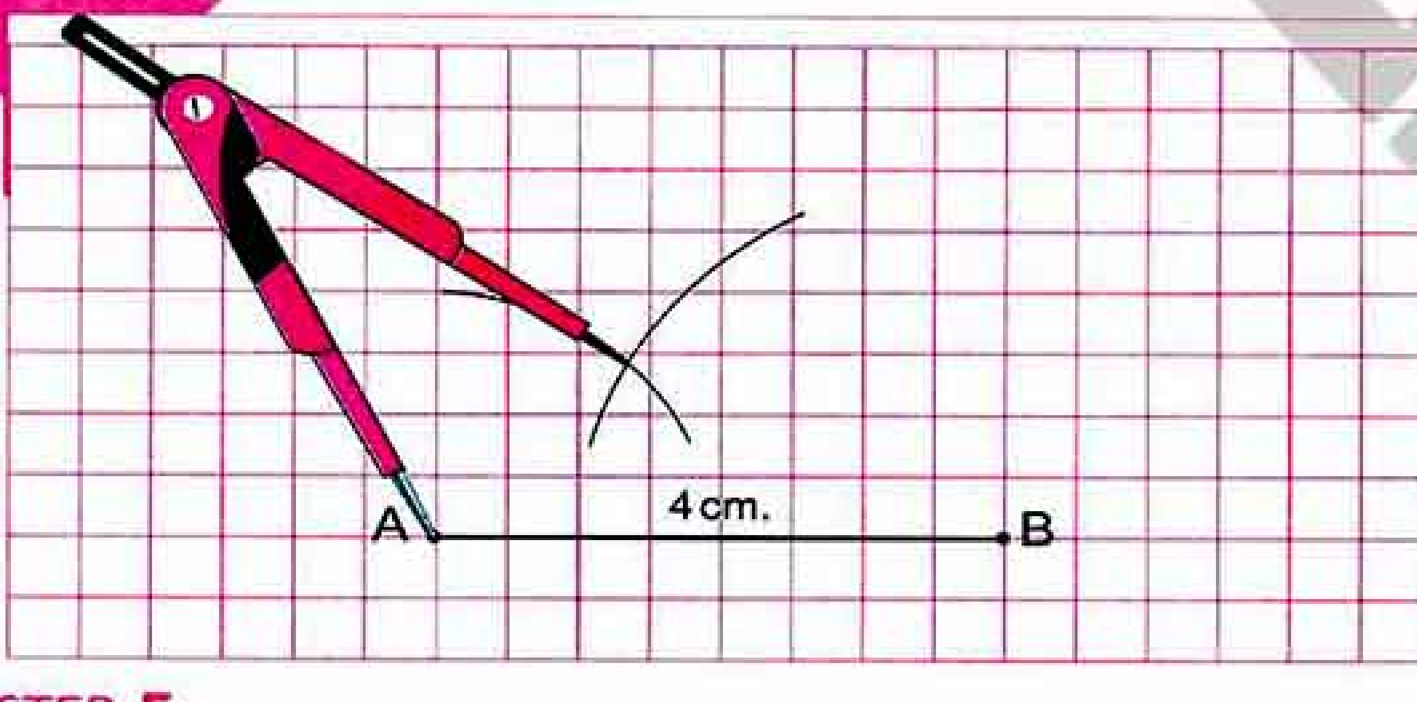
Open the compasses on the ruler such that the distance between the sharp point and the pencil equals 3 cm. to draw $\overline{BC}$

STEP 3



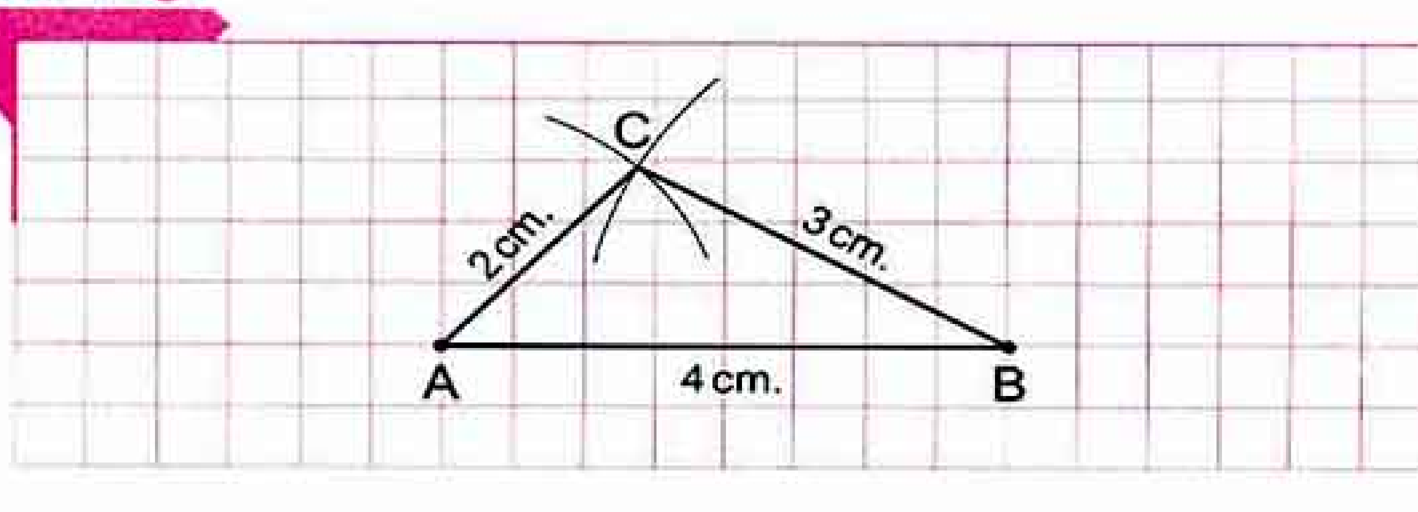
Place the sharp point at B and turn the compasses to draw an arc as in figure.

STEP 4



Similarly open the compasses to a distance equal to 2 cm. to draw $\overline{CA}$ and place the sharp point at A, then turn the compasses to draw another arc that intersects the first arc at the point C

STEP 5



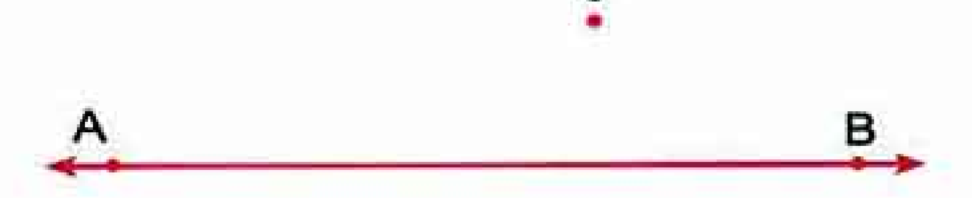
Draw each of $\overline{BC}$ and $\overline{CA}$, then the triangle ABC is the required triangle.



Drawing a line segment perpendicular to a straight line from a point outside it

For Example :

To draw a perpendicular from C to $\overleftrightarrow{AB}$ follow the following steps :



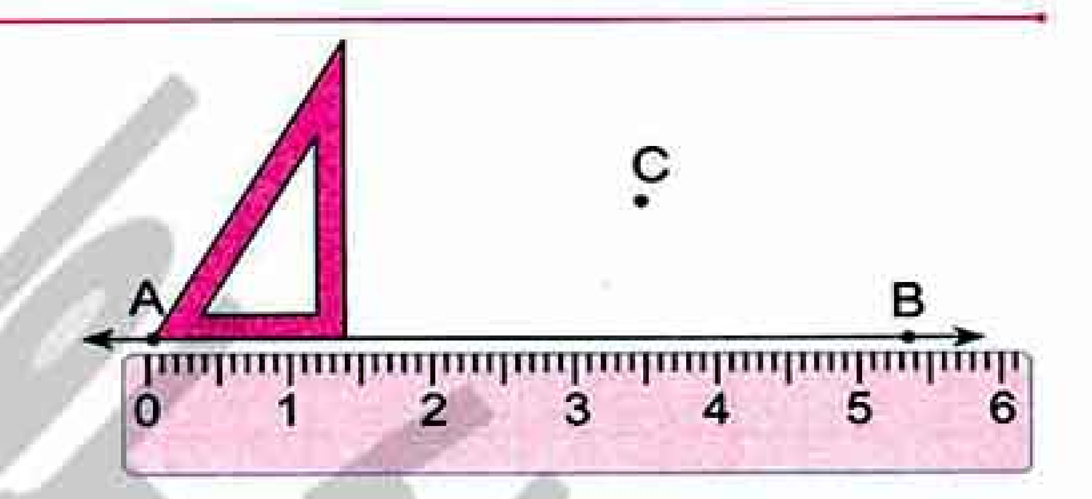
STEP 1

Put the edge of the ruler on $\overleftrightarrow{AB}$



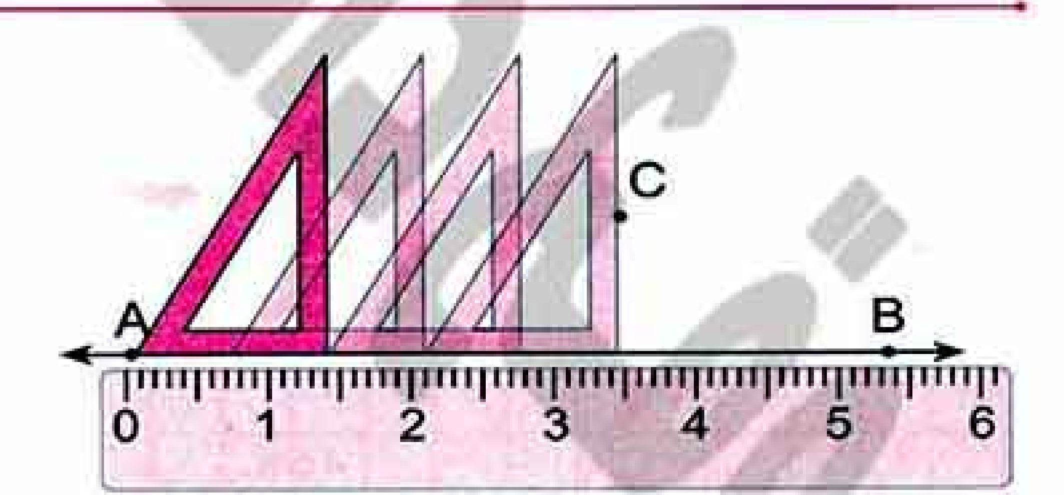
STEP 2

Put the edge of one side of the right angle of the set square on the edge of the ruler.



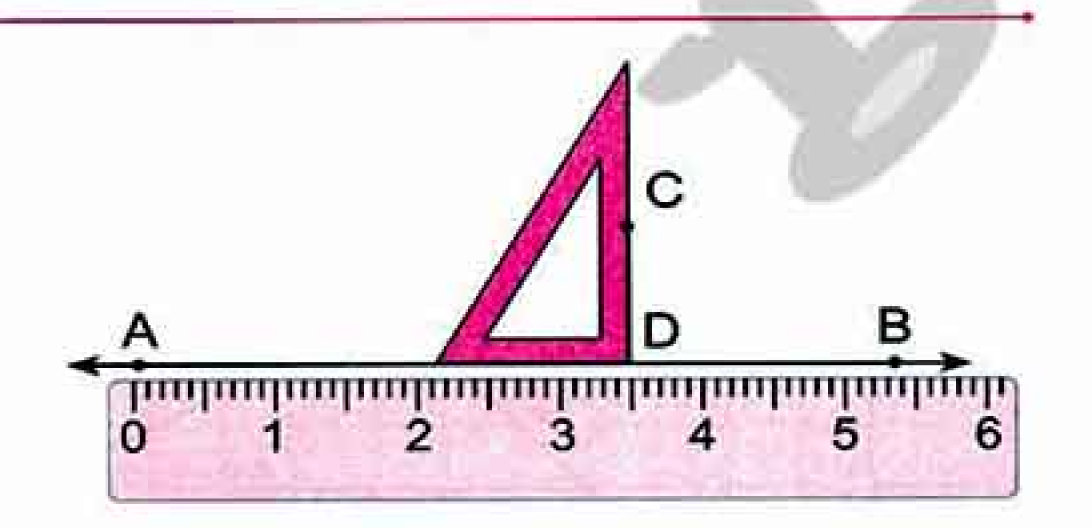
STEP 3

Move the set square in the direction of the arrow as in the opposite figure to slide along the edge of the ruler till it reaches the point C



STEP 4

From C draw a line segment intersects $\overleftrightarrow{AB}$ at D , then $\overline{CD} \perp \overleftrightarrow{AB}$





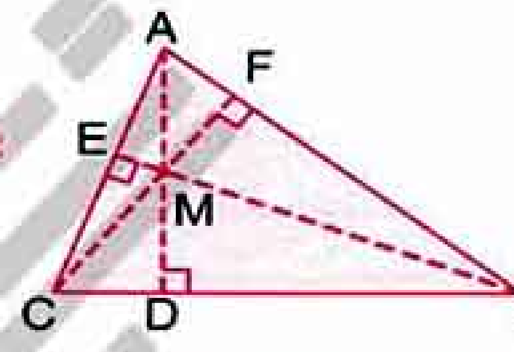


The altitudes of a triangle

An altitude of a triangle is a line segment drawn from a vertex of the triangle perpendicular to its corresponding base , or to its corresponding base extended.

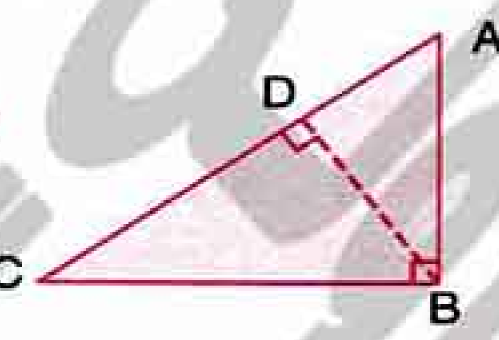
Remarks

- The altitudes of **an acute-angled triangle**



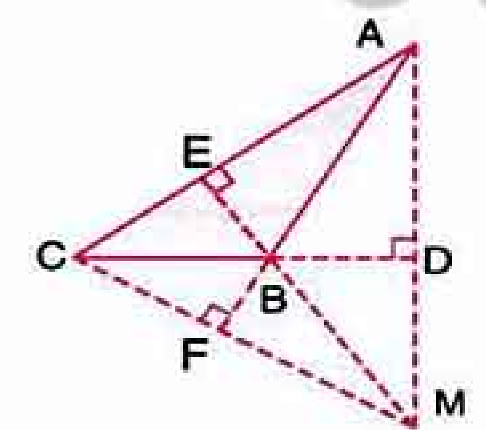
$\overline{AD}$, $\overline{BE}$ and $\overline{CF}$ are the altitudes of Δ ABC
They intersect at one point (M) **inside** the triangle.

- The altitudes of **a right-angled triangle**



$\overline{AB}$, $\overline{BC}$ and $\overline{BD}$ are the altitudes of Δ ABC
They intersect at one point (B) which is **the vertex of the right angle.**

- The altitudes of **an obtuse-angled triangle**



$\overline{AD}$, $\overline{BE}$ and $\overline{CF}$ are the altitudes of Δ ABC
$\overrightarrow{AD}$ and $\overrightarrow{CF}$ lie outside Δ ABC and the three altitudes intersect at one point (M) **outside** the triangle.



Summary of Unit Four

Experimental probability

$$\text{Experimental probability} = \frac{\text{Number of trials in which the outcome occurs}}{\text{Total number of trials}}$$

Sample space

The sample space of an experiment is the set of all possible outcomes of this experiment. It is usually denoted by (S)

For Example :

- Tossing a regular coin once , then S = {Head , Tail}
- Rolling a regular die once and observing the apparent number on the upper face , then S = {1 , 2 , 3 , 4 , 5 , 6}

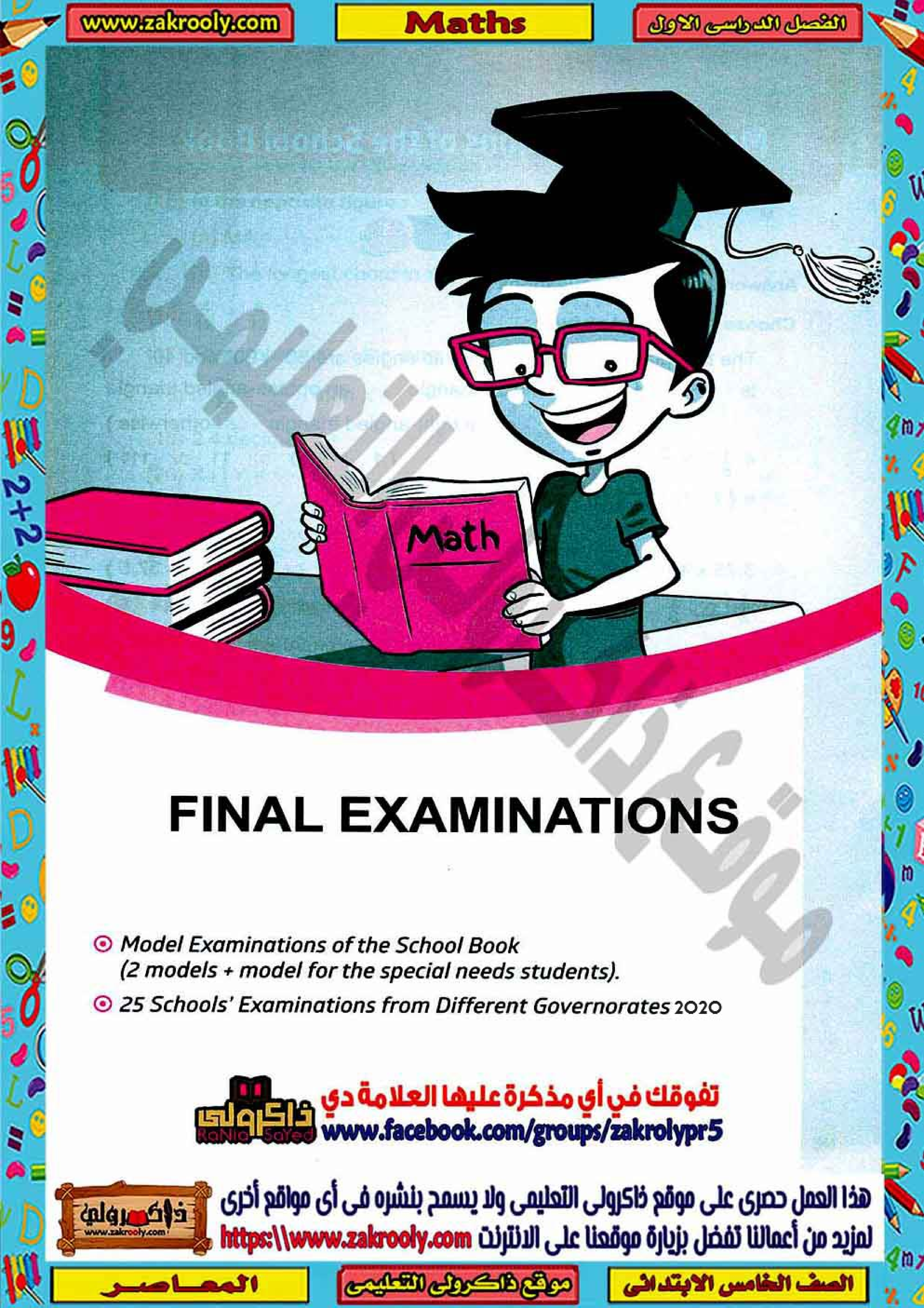
Event

In an experiment , **an event** is any subset of the sample space of this experiment.

Theoretical probability

Theoretical probability is finding the probability of events that come from a sample space of outcomes having equal chance to occur.

$$\text{The probability of an event to be occurred} = \frac{\text{Number of outcomes of the event}}{\text{Number of all possible outcomes}}$$



FINAL EXAMINATIONS

- *Model Examinations of the School Book (2 models + model for the special needs students).*
- *25 Schools' Examinations from Different Governorates* 2020

Model Examinations of the School Book

Model 1

Answer the following questions :

1 Choose the correct answer :

(1) The triangle whose measures of its angles are 50° , 90° and 40° is .... (a acute-angled triangle *or* an obtuse-angled triangle *or* a right-angled triangle *or* otherwise)

(2) $4\frac{1}{8} \times 2\frac{2}{3} =$ .... (1 *or* 10 *or* 11 *or* 111)

(3) If $\{7, 10\} \subset \{10, x+4\}$, then $x =$ .... (3 *or* 4 *or* 5 *or* 6)

(4) $3.75 \times 1000 =$ .... (0.375 *or* 0.0375 *or* 3750 *or* 37.5)

(5) $\frac{1}{2}$ ☐ $\frac{1}{3}$ ($<$ *or* $>$ *or* $=$ *or* $\leq$)

(6) X Y The shaded part is ....

($X \cap Y$ *or* $X \cup Y$ *or* $X - Y$ *or* $X \subset Y$)

(7) 55.241×100 ☐ 522.41×10 ($<$ *or* $>$ *or* $=$ *or* $\leq$)

(8) $\frac{2}{3} \times$ .... $= 1$ (1 *or* 2 *or* 3 *or* $\frac{3}{2}$)

(9) 43 day ≃ .... (to the nearest week) (4 *or* 6 *or* 5 *or* 7)

(10) Any chord passing through the centre of a circle is called .... (a diameter *or* a radius *or* a side *or* otherwise)

(11) $\{52\}$ .... $\{5, 2\}$ ($\in$ *or* $\notin$ *or* $\subset$ *or* $\not\subset$)

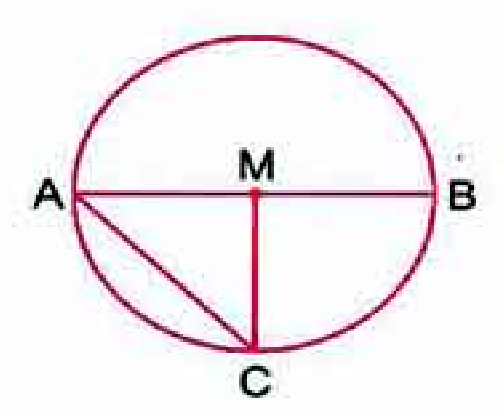
(12) $12.3 \times$ .... $= 1230$ (10 *or* 100 *or* 1000 *or* 10000)

(13) $Y = \{2, 4, 6\} \cap \{1, 2, 3\}$, then 6 .... Y ($\in$ *or* $\notin$ *or* $\subset$ *or* $\not\subset$)

(14) $\frac{5}{8}$ ☐ 0.5734 ($<$ *or* $>$ *or* $=$ *or* $\leq$)



2 Complete each of the following :



(15) **In the opposite figure :**

[a] MA = ... = ...

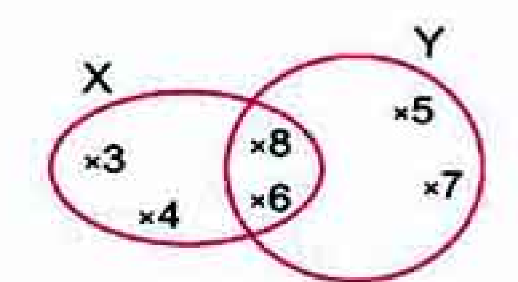
[b] The longest chord in the circle is ....

(16) $\frac{4}{12} \div \frac{6}{12}$ = ...

(17) The probability of the sure event = ...

(18) If $\frac{x}{8} = \frac{15}{24}$, then x = ...

(19) 2.4 decimetre = ... cm.



(20) X ∩ Y = ...

(21) 65.384 – .... = 65

(22) $\frac{3}{25} \div$ .... $= \frac{25}{3}$

3 Answer the following :

(23) Draw the triangle ABC where

AB = 4 cm. , BC = 6 cm. and CA = 8 cm.

, then draw a circle its centre is B and its radius length is 4 cm.

(24) From the table , find the probability that a pupil plays basketball :

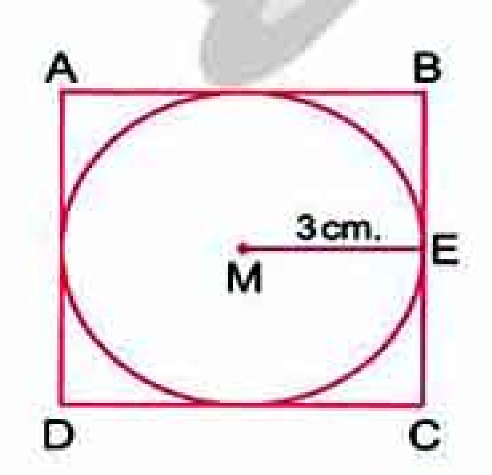
Game	Football	Basketball	Handball
Number of pupils	50	40	10

(25) Arrange in a descending order :

$$5\frac{1}{2} , 6\frac{1}{4} , 5\frac{3}{4} \text{ and } 5\frac{2}{5}$$

....

(26) **In the opposite figure :**



If ME = 3 cm. ,

then calculate the perimeter

of the square.



Model 2

Answer the following questions :

1 Choose the correct answer :

(1) 3.36 km. = ... m. (3.36 or 33.6 or 336 or 3360)

(2) $9\frac{3}{25} \simeq$ .... (to the nearest tenth)
(0.9 or 9.2 or 9.1 or 9)

(3) $\frac{5}{6} \div 1\frac{1}{6} =$ .... ($\frac{5}{7}$ or $\frac{2}{6}$ or $\frac{3}{7}$ or $\frac{7}{6}$)

(4) 0.312 × 100 ☐ 312 ÷ 100 (> or < or = or ≤)

(5) The smallest number from the following is ....
(0.111 or 0.12 or 0.123 or 1.023)

(6) 10 × 4.72 ☐ 100 × 0.472 (< or > or = or otherwise)

(7) $\frac{3}{5} \times 1.6 > 1.6 \times$ .... (0.6 or 1.6 or $\frac{5}{3}$ or 0.3)

(8) The shaded part represents ....

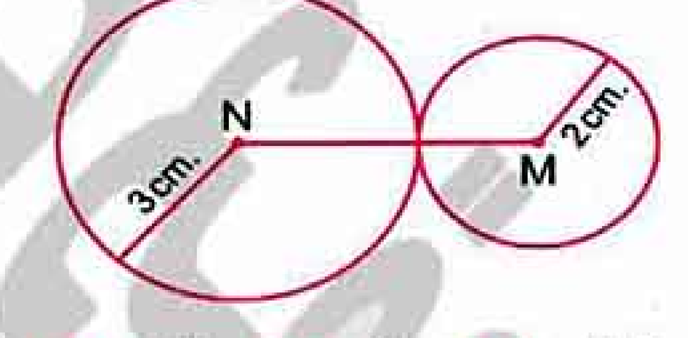
X Y

($X \cap Y$ or $X \cup Y$ or $X - Y$ or $Y - X$)

(9) If $Y = \{2, 3, 5\} \cap \{1, 3, 5\}$, then $\{1, 2, 3, 5\}$ .... Y
($\subset$ or $\not\subset$ or $\in$ or $\notin$)

(10) In the opposite figure :

MN = ... cm.

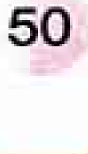


(2 or 3 or 6 or 5)

(11) The length of the diameter of any circle ☐ the length of any chord in it does not passing through the centre
(> or < or = or ≤)

(12) In any triangle the number of its heights = ...
(1 or 2 or 3 or 4)

(13) In a class there are 40 pupils , 25 of them are boys , the rest are girls , then the probability of the chosen pupil is a girl = ...
($\frac{3}{8}$ or $\frac{5}{8}$ or $\frac{3}{5}$ or 1)







(14) When tossing a coin once , then the probability of appearing a tail = ... (0 *or* 1 *or* $\frac{1}{2}$ *or* 2)

2 Complete each of the following :

(15) If the probability of a pupil succeed in an exam is $\frac{8}{10}$, then the probability of his fail = ...

(16) If $X \subset Y$, then $X \cap Y$ = ...

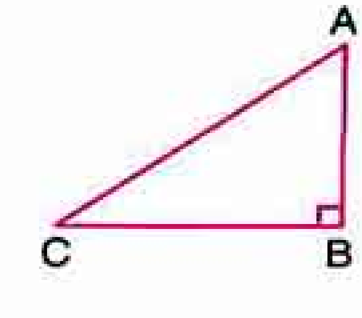
(17) In the opposite figure :

The corresponding height of the base $\overline{BC}$ is ....

A

C B

(18) The shaded part represents ....



(19) A circle its radius length = 1 cm. , then its diameter length = ... cm.

(20) 4.6798 ≃ .... (to the nearest thousandth)

(21) $2\frac{1}{4} \times \frac{\dots\dots}{\dots\dots} = 1$

(22) 3978 ÷ .... = 3.978

3 Answer the following :

(23) If U = {x : x is an odd number < 15} , X = {1 , 3} and Y = {1 , 5 , 9 , 13}, draw a Venn diagram that represents the sets U , X and Y , then find $X \cap Y$

(24) Draw a circle M of radius length 2.5 cm. , then draw the diameter $\overline{AB}$ and the chord $\overline{AC}$ of length 3 cm. Join $\overline{BC}$, then measure its length

(25) A box contains identical balls where 5 balls are white , 9 red and 6 black. If one ball is chosen randomly , what is the probability that the chosen ball is white ?

....

(26) A rectangle , its length is 4.1 cm. and its width is 3.5 cm. , calculate its area.

....



Model examination for the special needs students

Answer the following questions :

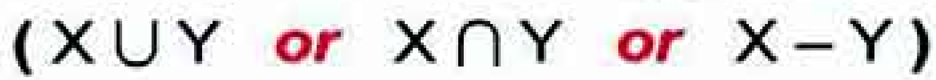
1 Choose the correct answer :

(1) $\frac{1}{3} \times \frac{3}{4} =$ .... ($\frac{1}{3}$ *or* $\frac{1}{2}$ *or* $\frac{1}{4}$)

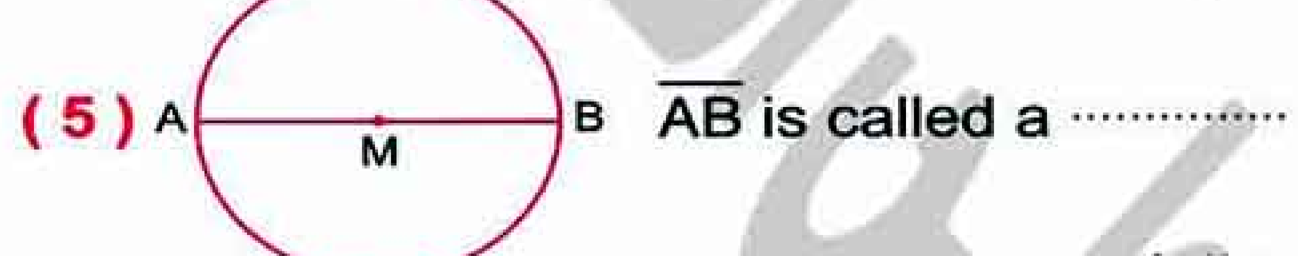
(2) If $3 \in \{x , 5\}$, then $x =$ .... (5 *or* 3 *or* 8)

(3) $312 \div 10 =$ .... (3.12 *or* 0.312 *or* 31.2)

(4) The shaded part is ....



($X \cup Y$ *or* $X \cap Y$ *or* $X - Y$)

(5) 

$\overline{AB}$ is called a ....

(diameter *or* radius *or* side)

(6) 14.4×10 ☐ 144 (> *or* < *or* =)

(7) In any triangle , there are .... heights. (1 *or* 2 *or* 3)

(8) $\{5\}$ .... $\{5 , 8\}$ ($\subset$ *or* $\notin$ *or* $\not\subset$)

(9) When tossing a coin once , the probability of appearing a tail = ... (1 *or* $\frac{1}{2}$ *or* $\frac{1}{4}$)

(10) $\frac{1}{2} =$ .... (5 *or* 0.5 *or* 0.05)

2 Use the following answers to complete the questions below :

($\frac{1}{6}$, 12.1 , 2 , 4.9 , $\{1 , 5\}$)

(1) $4.85 \simeq$ .... (to the nearest tenth)

(2) When tossing a die once , the probability of appearing the number 3 = ...

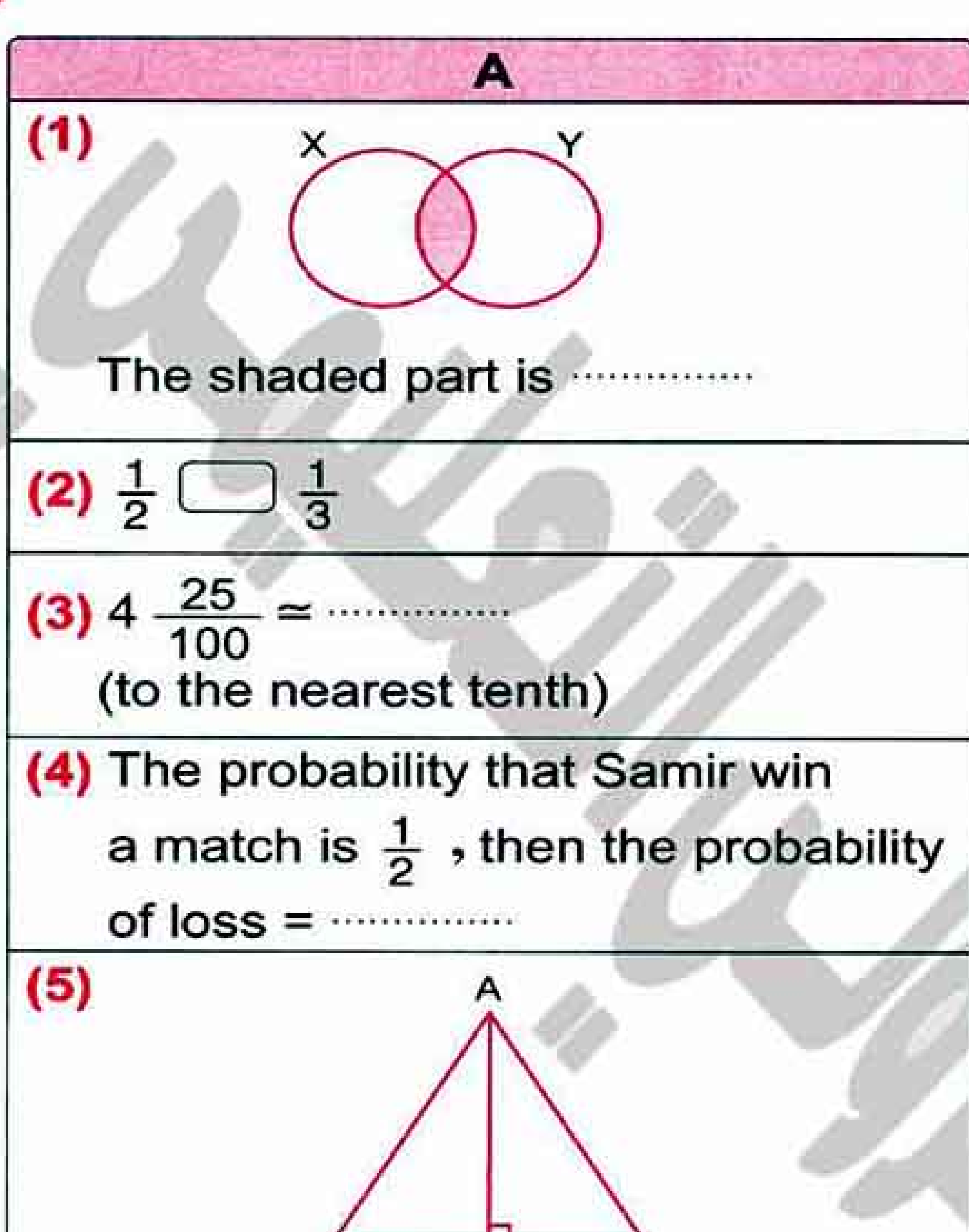
(3) $48.4 \div 4 =$ ....

(4) A circle of diameter length = 4 cm. , then its radius length = ... cm.

(5) If $X = \{1 , 2 , 5 , 7\}$, $Y = \{1 , 5 , 3\}$, then $X \cap Y =$ ....



3 Match :



A	B
(1) The shaded part is	>
(2) $\frac{1}{2}$ ☐ $\frac{1}{3}$	$\frac{1}{2}$
(3) $4\frac{25}{100} \simeq$ .... (to the nearest tenth)	$X \cap Y$
(4) The probability that Samir win a match is $\frac{1}{2}$, then the probability of loss = ...	altitude
(5) $\overline{AD}$ is called	4.3

Some Schools' Examinations From Different Governorates

1 Cairo Governorate

East Nasr City Educational Zone
Manaret Heliopolis School



Answer the following questions :

1 Choose the correct answer :

(1) $4.25 \times 100 =$ .... (425 or 42.5 or 42500 or 4250)

(2) If $4 \in \{2, x, 5\}$, then $x =$ .... (2 or 4 or 5 or 6)

(3) The number of altitudes in the right-angled triangle is ....
(1 or 2 or 3 or 4)

(4) The number $83.7694 \simeq 83.77$ to the nearest ....
(0.1 or 0.01 or 0.001 or 0.0001)

(5) If $\{7, 10\} \subset \{10, x + 4\}$, then $x =$ .... (3 or 4 or 5 or 6)

(6) $\frac{5}{6} \div 1\frac{1}{6} =$ .... ($\frac{5}{7}$ or $\frac{2}{6}$ or $\frac{3}{7}$ or $\frac{7}{6}$)

(7) $\frac{1}{2}$ ☐ $\frac{1}{3}$ (< or > or = or otherwise)

(8) The reciprocal of $3\frac{1}{2}$ .... ($\frac{7}{2}$ or $\frac{2}{7}$ or $3\frac{2}{1}$ or 8)

(9) If $X \subset Y$, then $X \cap Y =$ .... (X or Y or U or $\varnothing$)

(10) 7 .... $\{77, 17\}$ ($\in$ or $\notin$ or $\subset$ or $\not\subset$)

(11) $\varnothing$ .... $\{A, B\}$ ($\in$ or $\notin$ or $\subset$ or $\not\subset$)

(12) The longest chord in the circle is called a ....
(diameter or chord or radius or centre)

(13) $\frac{2}{3}$ of $\frac{9}{10} =$ .... ($\frac{2}{3}$ or $\frac{3}{5}$ or $\frac{3}{8}$ or $\frac{9}{3}$)

(14) The smallest prime number is .... (1 or 2 or 3 or 0)

2 Complete :

(15) $71.5 \div$ .... $= 7.15$

(16) $76.759 + 59.695 =$ .... $\simeq$ .... (to the nearest $\frac{1}{10}$)

(17) If $\{3, 4\} \subset \{2, 3, a - 1\}$, then a = ...

(18) The point of intersection of the three altitudes of the obtuse-angled triangle lies .... the triangle.





(19) If $\frac{3}{8} = \frac{a}{24}$, then a = ...

(20) The line that joins between the centre of the circle and any point on the circle is called ....

(21) The probability of the impossible event is ....

(22) 3 days = ... hours.

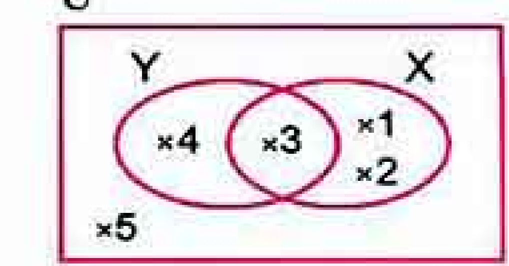
3 **Answer the following :**

(23) A box contains 5 red balls , 8 black balls and 7 white balls , one of them is dawn randomly , find the probability of drawing a ball which is :

[a] Black = ... [b] Green = ...

[c] Red or black = ... [d] Not red = ...

(24) From the opposite Venn diagram , find :



[a] $X \cap Y$ = ... [b] $X \cup Y$ = ...

[c] $X - Y$ = ... [d] Y' = ...

(25) Find :

[a] $6188 \div 221$ = ... [b] 2.1×0.34 = ...

(26) Draw the triangle ABC in which AB = 7 cm. and BC = AC = 6 cm.
, then draw $\overline{CD} \perp \overline{AB}$
, then find its length.

2 Cairo Governorate

Rod El-Farag Educational Zone
St. Mary's School



Answer the following questions :

1 **Choose the correct answer :**

(1) If $6 \in \{3 , 5 , 2x\}$, then x = ... (2 *or* 3 *or* 4 *or* 5)

(2) $\{7 , 8\}$ .... $\{5 , 7 , 10\}$ ($\in$ *or* $\subset$ *or* $\notin$ *or* $\not\subset$)

(3) In any triangle , the number of its heights = ...
(1 *or* 2 *or* 3 *or* 4)

(4) Any chord passing through the centre of a circle is called ....

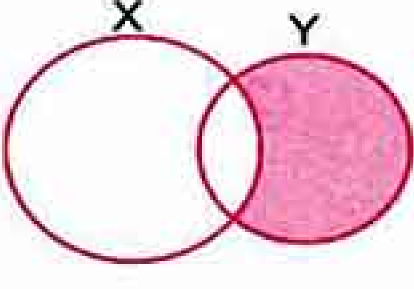
(a diameter *or* a radius *or* a chord *or* otherwise)

(5) {52} .... {5 , 2} ($\in$ *or* $\subset$ *or* $\notin$ *or* $\not\subset$)

(6) $2\frac{1}{3} \div \frac{5}{3} =$ .... ($\frac{7}{5}$ *or* $\frac{5}{7}$ *or* $\frac{3}{7}$ *or* $\frac{5}{2}$)

(7) $9\frac{3}{25} \simeq$ .... (to the nearest tenth) (0.9 *or* 9.2 *or* 9.11 *or* 9.1)

(8) The shaded part in the opposite figure represents ....



(X – Y *or* Y – X *or* X ∪ X *or* X ∩ Y)

(9) $4\frac{1}{8} \times 2\frac{2}{3} =$ .... (1 *or* 10 *or* 11 *or* 111)

(10) $\frac{5}{8}$ ☐ 0.5734 (> *or* = *or* < *or* ≤)

(11) 55.241 × 100 ☐ 552.41 × 10 (> *or* = *or* < *or* otherwise)

(12) $\left(2\frac{1}{2} + 7\frac{1}{2}\right) \div \frac{1}{5} =$ .... (2 *or* 5 *or* 10 *or* 50)

2 Complete the following :

(13) If X ⊂ Y , then X ∩ Y = ...

(14) {2 , 3 , 5} ∩ {1 , 3 , 5} = ...

(15) 397.8 ÷ 23.4 = ...

(16) $\frac{3}{25} \div 0.012 =$ ....

(17) If the probability of a pupil succeed in an exam is $\frac{8}{10}$
, then the probability of his fail is ....

(18) The altitudes in obtuse-angled triangle intersect at the point that ....

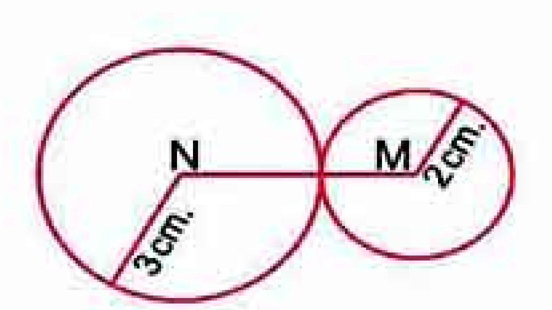
(19) (8.3 – 2.14) × 100 = ...

(20) If {4 , a , 7} = {b , 5 , 7} , then a = ... and b = ...

(21) 1.775 × 0.15 ≃ .... (to the nearest hundredth)

(22) **In the opposite figure :**

The length of $\overline{MN}$ = ...









3 **Answer the following :**

(23) A bag contains 4 white balls , 5 red balls and 6 black balls.
All balls are identical and equal in size. If a ball is drawn randomly.
What is the probability that the drawn ball is :

[a] Red ? .... **[b]** White or black ? ....

(24) If the price of one metre of cloth is L.E. 6.45
What is the cost of 2.4 metres of cloth ?

....

(25) If U = {1 , 2 , 3 , 4 , 5 , 7 , 9}
, X = {1 , 2 , 3 , 4} and Y = {3 , 4 , 7 , 9}
Draw a Venn diagram that represents
the sets U , X and Y

(26) Draw the Δ ABC where AB = 4 cm.
, BC = 5 cm. and CA = 6 cm.
, then draw its altitudes.
What is the type of Δ ABC according
to its side lengths ?

3 Cairo Governorate

El-Mataryia Educational Zone
Gaber Al-Ansary Language School



Answer the following questions :

1 **Complete the following :**

(1) 36.274 + 33.28 = ... ≃ .... (to the nearest $\frac{1}{100}$)

(2) $\frac{1}{2} \div \frac{1}{8}$ = ...

(3) 2 600 gm. ≃ .... kg. (to the nearest kg.)

(4) {3 , 4 , 5} ∪ {1 , 4 , 5} = ...

(5) If {2 , 5 , 7} = {5 , x , 2} , then x = ...



(6) The longest chord in the circle is called ....

(7) ABC is an equilateral triangle of side length 4.1 cm.
, then its perimeter = ... cm.

(8) The probability of the impossible event is ....

2 Choose the correct answer :

(9) The right-angled triangle has .... altitudes. (0 or 1 or 2 or 3)

(10) The length of the diameter = ... ($\frac{1}{2} \times r$ or r or $2 \times r$ or $3 \times r$)

(11) If $X \subset Y$, then $X \cap Y$ = ... (X or Y or U or $\grave{X}$)

(12) If $U = \{2, 3, 4, 5, 6, 7\}$, then $\varnothing$ .... U
($\notin$ or $\in$ or $\not\subset$ or $\subset$)

(13) 3 .... the set of odd numbers. ($\notin$ or $\in$ or $\not\subset$ or $\subset$)

(14) The set of odd numbers is .... set.
(a finite or an infinite or an empty)

(15) $\{3, 4\}$ .... $\{3, 4, 5, 2\}$ ($\notin$ or $\in$ or $\not\subset$ or $\subset$)

(16) $\frac{1}{2} \times 4$ = ... (2 or 4 or 3 or 6)

(17) The quotient of dividing $2.25 \div 1.5$ = ...
(1.5 or 15 or 0.15 or 500)

(18) $\frac{1}{2}$ ☐ $\frac{3}{4}$ ($<$ or $>$ or $\geq$ or $=$)

(19) $327 \div 24 = 3.27 \div$ .... (2.4 or 0.24 or 240 or 2400)

(20) $7.64 \times 0.93 \simeq$ .... (to the nearest thousandth)
(7.1052 or 710.52 or 7.105 or 7.106)

(21) $54.593 \simeq 54.6$ to the nearest ....
($\frac{1}{10000}$ or $\frac{1}{10}$ or $\frac{1}{100}$ or $\frac{1}{1000}$)

(22) $325.4 \div 10$ ☐ $3254 \div 100$ ($<$ or $>$ or $=$)

3 Answer the following :

(23) A box contains 6 yellow balls , 3 blue balls and 3 red balls. If one ball is drawn randomly , find the probability that the drawn ball is :

[a] Yellow = ... [b] Not blue = ...



(24) By using the opposite Venn diagram , find :

U
Y X
$\times 1$ $\times 2$ $\times 3$ $\times 5$ $\times 9$
$\times 6$ $\times 4$

[a] $X \cup Y =$ ....

[b] $X \cap Y =$ ....

[c] $X - Y =$ ....

[d] $\grave{Y} =$ ....



(25) Draw Δ ABC where AB = 6 cm.

, AC = BC = 5 cm.

, then draw $\overline{CD} \perp \overline{AB}$

(26) Find with steps :

[a] $53.55 \div 3.15 =$ .... **[b]** $2\ \frac{3}{4} \div 1\ \frac{3}{8} =$ ....





4 Cairo Governorate

Dar El-Salam and El-Basateen Educational Zone
Mathematics Supervision

Answer the following questions :

1 Complete the following :

(1) $\frac{3}{7} \times$ .... $= 1$

(2) $\{5 , 6\} \cap \{4 , 5\} =$ ....

(3) $84.61 + 23.473 =$ .... $\simeq$ .... (to the nearest 2 decimal places)

(4) If $\frac{x}{8} = \frac{15}{24}$, then $x =$ ....

(5) If $X \subset Y$, then $X \cap Y =$ ....

(6) The longest chord in the circle is called ....

(7) The number of elements of the null set = ...

(8) The altitudes of the right-angled triangle intersect at one point located at ....

(9) The probability of the certain event is ....

(10) The area of the rectangle of 15.5 metres length and 5.5 metres width is ....

2 Choose the correct answer :

(11) If $\{4 , 8\} = \{1 + y , 4\}$, then y = ... (3 *or* 4 *or* 6 *or* 7)

(12) The number of altitudes of any triangle = ...

(1 *or* 2 *or* 3 *or* 4)



(13) 10×4.72 ☐ 100×0.472 (> or < or = or otherwise)

(14) $\varnothing$ .... $\{3 , 5\}$ ($\notin$ or $\in$ or $\subset$ or $\not\subset$)

(15) ABC is an equilateral triangle of side length 4.5 cm.
, then its perimeter = ... cm. (12 or 13.5 or 15 or 9)

(16) The smallest number from the following is ....
(0.111 or 0.12 or 0.123 or 1.023)

(17) When tossing a coin once , then the probability of appearing a tail = ... (0 or 1 or $\frac{1}{2}$ or 2)

(18) $\{1 , 2\} \cup \{2 , 3\}$ = ... ($\{2\}$ or $\{1 , 3\}$ or $\{1 , 2 , 3\}$ or $\varnothing$)

3 Answer the following :

(19) Arrange in a descending order : $\frac{1}{4}$, 0.8 , 0.4 and $\frac{1}{2}$
The order is : .... , ... , ... and ....

(20) $5 \frac{1}{3} \times 9$ = ...

(21) 2.5×4.42 = ...

(22) $25.25 \div 0.25$ = ...

(23) $\{2 , 5 , 8\} - \{3 , 5 , 7\}$ = ...

(24) Draw the equilateral triangle ABC whose side length is 6 cm.
, then draw the three altitudes of this triangle.

(25) If the universal set $U = \{x : x$ is an odd number less than $15\}$,
$X = \{1 , 3 , 5\}$ and $Y = \{1 , 5 , 9 , 13\}$
Draw a Venn diagram which represents the sets U , X and Y,
then find : $X \cap Y$, $X - Y$ and Y'

(26) As thrown a fair die once , calculate the probability of :
[a] Appearing a number greater than 6
[b] Appearing an even number



5 Giza Governorate

El-Dokki Educational Directorate
Talaee Al-Mustakbal Language School



Answer the following questions :

1 Choose the correct answer :

(1) 5.035 ≃ .... (to the nearest $\frac{1}{100}$) (5 or 500 or 5.04 or 5.03)

(2) If $X \subset Y$, then $X \cap Y =$ .... (X or Y or $\varnothing$)

(3) The probability of impossible event = ... (0 or 1 or $\frac{1}{2}$ or $\varnothing$)

(4) The set of odd numbers is .... set.
(a finite or an empty or an infinite)

(5) 32.5 ÷ 100 = ... (0.32 or 0.325 or 3250 or 325.2)

(6) The number of subsets of the set {a , b} is ....
(3 or 4 or 5 or 2)

(7) 327.5 × 100 = ... (3276 or 32750 or 327500)

(8) $\frac{2}{4}$ ☐ $\frac{1}{2}$ (> or < or = or ≠)

(9) The radius length of the circle = ... the diameter length.
($\frac{1}{2}$ or $\frac{1}{4}$ or 2)

(10) The probability of sure event = ... (1 or 0 or 10 or $\varnothing$)

(11) The probability of getting an odd number when rolling a die once = ... ($\frac{1}{2}$ or $\frac{1}{3}$ or 2 or 0)

(12) The length of any chord ☐ the length of the diameter in the same circle. (< or > or ≤ or =)

(13) $\varnothing$ .... {0} ($\in$ or $\notin$ or $\subset$ or $\not\subset$)

(14) If $\{5 , 7\} = \{x + 2 , 5\}$, then $x =$ .... (2 or 5 or 7 or 3)

2 Complete the following :

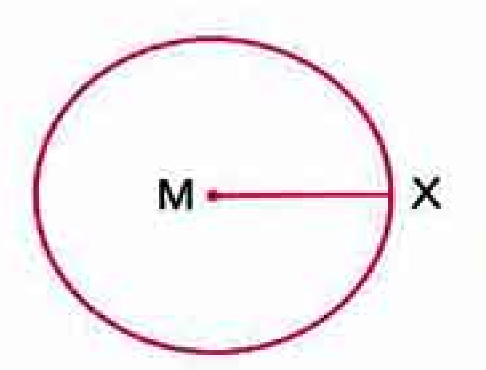
(15) If $X \cap Y = \varnothing$, then X and Y are .... sets.

(16) 25.71 + 3.5 = ... ≃ .... (to the nearest $\frac{1}{10}$)

(17) $\frac{2}{5} \div \frac{7}{5} =$ ....

(18) $1\frac{2}{3} \times \frac{3}{7} =$ ....





(19) In the opposite figure :

$\overline{MX}$ is called ....

(20) 22.5 ÷ .... = 0.225

(21) 36 days ≃ .... weeks (to the nearest week)

(22) The measure of the right angle = ...°

3 Answer the following :

(23) 8636 ÷ 254 = ... (with steps)

(24) Arrange in an ascending order :

$\frac{1}{2}$, $3\frac{1}{4}$, $7\frac{1}{8}$ and 0.2

The order is : .... , ... , ... and ....

(25) A box contains 5 red balls , 3 blue balls and 2 black balls , what's the probability of getting :

[a] Red ball ? ....

[b] Yellow ball ? ....

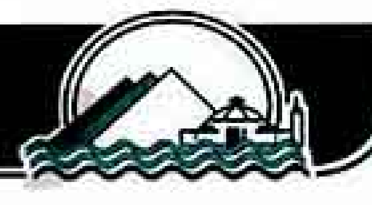
[c] Black or red ball ? ....

[d] Blue ball ? ....

(26) Using your compasses and ruler to draw Δ ABC where AB = 7 cm. and BC = AC = 5 cm. , then draw $\overline{CD} \perp \overline{AB}$, find the length of $\overline{CD}$

6 Giza Governorate

El-Haram Educational Directorate
Elwy Language Schools



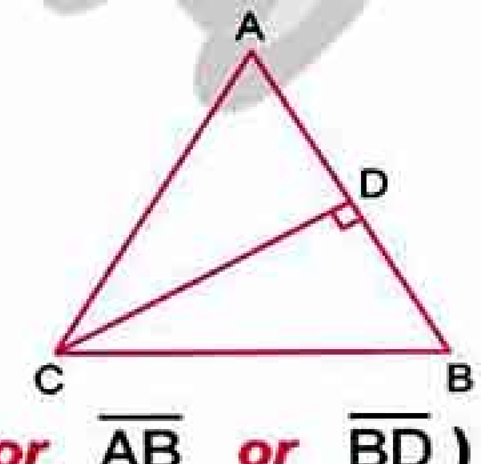
Answer the following questions :

1 Choose the correct answer :

(1) If $\frac{1}{2} = \frac{x}{8}$, then x = ... (1 or 3 or 4 or 5)

(2) The decimal form of the fraction $\frac{13}{20}$ is .... (0.13 or 0.65 or 6.5 or 0.065)

(3) In Δ ABC , ... is the corresponding base to the altitude $\overline{CD}$



($\overline{AC}$ or $\overline{BC}$ or $\overline{AB}$ or $\overline{BD}$)





(4) In a square , if its side length = 3.5 cm. , then its area = ... cm^2.
(14 **or** 122.5 **or** 12.25 **or** 7)

(5) If $X \subset Y$, then $X \cap Y$ = ... (X **or** Y **or** $X \cup Y$ **or** $X - Y$)

(6) 78.95 + 59.379 ≃ .... (to the nearest $\frac{1}{100}$)
(67.274 **or** 138.3 **or** 138.32 **or** 138.33)

(7) 51 days ≃ .... weeks (to the nearest week) (5 **or** 6 **or** 7 **or** 8)

(8) If {4 , 7} = {7 , x – 1} , then x = ... (3 **or** 4 **or** 5 **or** 6)

(9) 987.65 cm. ≃ .... metres. (98765 **or** 99 **or** 98 **or** 10)

(10) $2\frac{1}{4} \div 3\frac{3}{8}$ = ... ($1\frac{1}{2}$ **or** $\frac{2}{3}$ **or** $\frac{243}{32}$ **or** $\frac{3}{32}$)

(11) $\frac{1}{2}$ hour ≃ .... minutes. (15 **or** 30 **or** 45 **or** 60)

(12) $1\frac{2}{3} \times 1\frac{1}{5}$ = ... ($2\frac{3}{8}$ **or** 2 **or** $1\frac{7}{18}$ **or** $\frac{13}{15}$)

(13) A chord which passes through the centre of a circle is called a ....
(radius **or** diameter **or** tangent **or** side)

(14) The smallest fraction of the following is .... ($\frac{1}{3}$ **or** $\frac{2}{5}$ **or** $\frac{5}{8}$ **or** $\frac{2}{9}$)

2 Complete each of the following :

(15) The probability of an impossible event = ...

(16) In an equilateral triangle , if its side length is 7.25 cm.
, then its perimeter = ... cm.

(17) 859.7 ÷ 1000 = ...

(18) {2 , 3 , 5} ∩ {23 , 35} = ...

(19) {1 , 4 , 7} ∩ {4 , 5} = ...

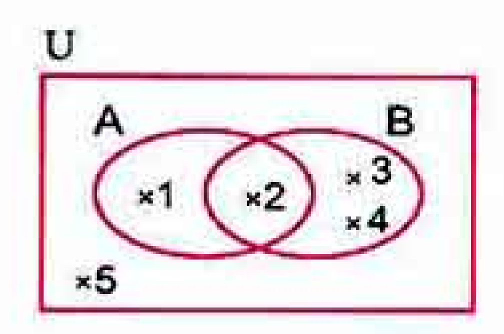
(20) The number of altitudes of any triangle is ....

(21) The sum of the measures of the interior angles of any triangle = ...°

(22) $6\frac{1}{4}$ km. = ... metres.

3 Answer the following :

(23) From the opposite figure , find :



[a] A – B = ...

[b] A` = ...



(24) Draw a circle M of radius length 4 cm.

, draw the diameter $\overline{AB}$

, the chord $\overline{AC}$ of length 5 cm.

, and the chord $\overline{BC}$

, then find by measuring :

[a] The length of $\overline{BC}$ = ...

[b] m (∠ C) = ...°

(25) A box contains 6 white balls , 9 red balls and 4 yellow balls , all of them are equal in size. One ball is drawn randomly from this box.

Find the probability of getting :

[a] White ball = ...

[b] Ball which is not yellow = ...

(26) If the price of one metre of cloth is L.E. 39.8

What is the price of 8.5 metres to the nearest L.E. ?

....

7 Alexandria Governorate

West Educational Zone
Maths Supervision



Answer the following questions :

1 **Choose the correct answer :**

(1) $\frac{3}{4}$ of a day = ... hours. (24 or 30 or 18 or 12)

(2) 5 .... {8 , 6} ∩ {3 , 6 , 1 , 5} (∈ or ∉ or ⊂ or ⊄)

(3) ∅ .... {2 , 6 , 1 , 5} (∈ or ∉ or ⊂ or ⊄)

(4) The length of the longest chord in the circle is 6 cm. , then the length of the radius of this circle = ... cm. (6 or 3 or 4.5 or 12)





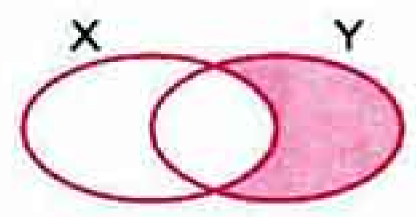
(5) 4.75 km. = ... m. (4.75 or 47.5 or 475 or 4750)

(6) When tossing a coin once, then the probability of appearing a tail = ... (0 or 1 or $\frac{1}{2}$ or 2)

(7) The right-angled triangle has .... height(s). (1 or 3 or 4 or 2)

(8) $36.762 \simeq$ .... (to the nearest hundredth) (36.762 or 36.8 or 36.76 or 36.76)

(9) The shaded part in the opposite figure represents ....



($X \cap Y$ or $X - Y$ or $X \cup Y$ or $Y - X$)

(10) 4.238×100 ☐ 420.38×10 (< or > or =)

(11) The probability of the certain event = ... (0 or 1 or $\frac{1}{2}$ or $\varnothing$)

(12) If $A \subset B$, then $A \cap B$ = ... (A or B or $\varnothing$ or À)

(13) If $\frac{2}{3} = \frac{a}{12}$, then a = ... (4 or 3 or 12 or 8)

(14) $4\frac{1}{2}$ ☐ 4.51 (< or > or =)

2 Complete each of the following :

(15) All the radii of the circle are ....

(16) If $\{1, x + 3\} = \{9, 1\}$, then x = ...

(17) The altitudes of the obtuse-angled triangle intersect at one point which lies .... the triangle.

(18) $\{2, 6, 1, 5\} - \{3, 6, 1, 5\}$ = ...

(19) 38.76 + 25.38 = ...

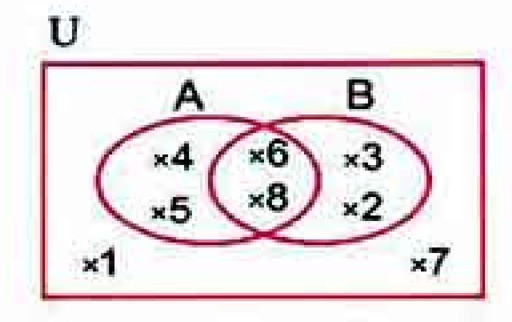
(20) 896.42 ÷ 100 = ...

(21) 0.675 × 2.3 = ...

(22) $12\frac{1}{2} \div 6\frac{1}{4}$ = ...

3 Answer the following :

(23) By using the opposite Venn diagram, find :



[a] $A \cap B$ = ...

[b] $A \cup B$ = ...

[c] $A - B$ = ...

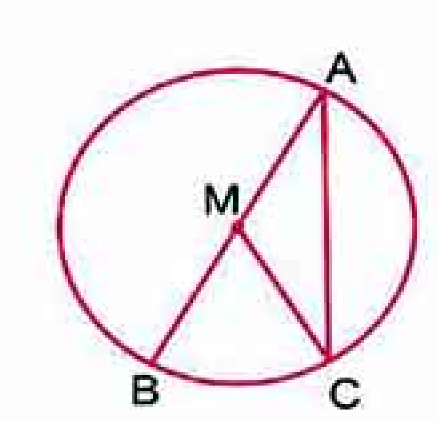
[d] À = ...



(24) A box contains 5 white balls , 2 blue balls and 4 red balls , all of balls are equal in size, one ball is drawn ranbomly , find the probability that the drawn ball is :

[a] White = ... **[b]** Not green = ...

(25) Complete using the opposite figure :



[a] $\overline{AB}$ is called ....

[b] $\overline{AC}$ is called ....

(26) Draw the triangle ABC in which AB = 6 cm. , BC = 8 cm. and AC = 10 cm.

[a] Find by measuring m (∠ B)

[b] What is the type of Δ ABC according to its angles ?

8 Alexandria Governorate

Al-Agamy Educational Zone
Maths Supervision



Answer the following questions :

1 Choose the correct answer :

(1) (72.12 + 12.7) ÷ 100 = ... (0.8419 *or* 0.8482 *or* 84.82)

(2) $\frac{1}{2} \div \frac{7}{4}$ = ... (in the simplest form) ($\frac{7}{8}$ *or* $\frac{4}{14}$ *or* $\frac{2}{7}$)

(3) 8.657 m. = ... cm. (865.7 *or* 8657 *or* 866)

(4) 3721 ÷ 1000 ☐ 0.3721 × 100 (< *or* > *or* =)

(5) 33.51 kg. = ... gm. (3351 *or* 33510 *or* 335100)

(6) ∅ .... {0} (∈ *or* ∉ *or* ⊄ *or* ⊂)

(7) If {3 , 5 , 9} = {5 , x + 1 , 3} , then x = ... (9 *or* 8 *or* 4 *or* 16)





(8) In a triangle ABC, if m (∠ A) = 50° and m (∠ C) = 60°, then the triangle is ....-angled triangle.
(an acute **or** a right **or** an obtuse)

(9) 35 .... the set of digits of number 3500 ($\in$ **or** $\notin$ **or** $\not\subset$ **or** $\subset$)

(10) If the length of the longest chord of the circle is 13 cm., then the length of any radius = ... cm. (26 **or** 6 **or** 6.5 **or** 11)

(11) $\{12\} - \{12, 14\}$ = ... (12 **or** {14} **or** ∅ **or** {0})

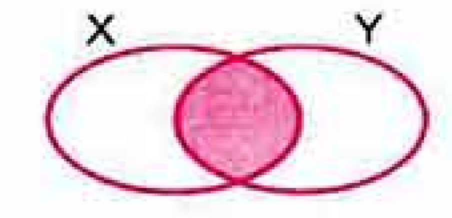
(12) The number of the altitudes of the triangle is ....
(4 **or** 2 **or** 3 **or** 1)

(13) 15 ÷ 4 ≃ .... (to the nearest tenth) (3.75 **or** 3.8 **or** 3.7 **or** 4)

(14) $2\frac{4}{5}$ ☐ 2.16 (< **or** > **or** =)

2 **Complete the following :**

(15) The shaded part in the opposite figure represents .... of two sets.



(16) When tossing a die once the probability of appearing a prime number is ....

(17) A square of side length 6.5 cm., its area is .... cm^2.

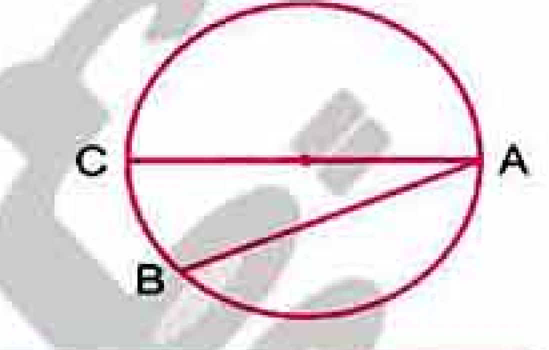
(18) 240 months = ... years.

(19) The altitudes of the acute-angled triangle intersect at one point .... the triangle.

(20) $\{2, 12, 7, 10\} \cap \{5, 4, 12, 10\}$ = ...

(21) $\frac{12}{9} \div 1\frac{3}{27}$ = ... (in the simplest form)

(22) In the opposite figure :
$\overline{AB}$ is called .... of the circle.



3 **Answer the following :**

(23) If U = {0, 2, 4, 6, 8, 10}
, X = {2, 6, 8} and Y = {6, 10}
, draw a Venn diagram that represents the sets U, X and Y
, then find X ∩ Y, X and Y



(24) Arrange in a descending order : 0.225 , $\frac{3}{8}$, $\frac{3}{4}$ and 0.45

....

(25) In a school, there are 250 girls and 350 boys, a student is chosen randomly, find :

[a] The probability that the chosen student is a boy = ...

[b] The probability that the chosen student is a girl = ...

(26) Draw a triangle ABC where

AB = 6 cm. and BC = AC = 5 cm.

9 El-Kalyoubia Governorate

Banha Educational Zone
Maths Supervision



Answer the following questions :

1 **Choose the correct answer from those given :**

(1) 3 .... {3 , 13 , 23 , 33} ($\in$ or $\notin$ or $\subset$ or $\not\subset$)

(2) 3.75 × 1000 = ... (0.375 or 0.0375 or 3750 or 37.5)

(3) $\frac{1}{3} \times \frac{3}{4}$ = ... ($\frac{1}{3}$ or $\frac{3}{4}$ or $\frac{1}{2}$ or 0.25)

(4) The perimeter of the equilateral triangle which its side length is 3.2 cm. = ... cm. (9 or 9.2 or 9.6 or 9.4)

(5) 43 days ≃ .... weeks (to the nearest week) (4 or 5 or 6 or 7)

(6) If $\frac{a}{3} = \frac{5}{15}$, then a = ... (4 or 5 or 1 or 2)

(7) 14.4 × 10 ☐ 144 (> or < or = or otherwise)

(8) ∅ .... {5 , 6} ($\not\subset$ or $\subset$ or $\in$ or $\notin$)

(9) 31.295 + 21.61 ≃ .... (to the nearest $\frac{1}{100}$)

(52.905 or 52.90 or 52.91 or 52.92)



(10) $\{1, 3, 5\} \cap \{2, 4, 6\} =$ ....
($\{1, 2\}$ or $\varnothing$ or $\{4, 6\}$ or $\{2, 4, 6\}$)

(11) $\frac{7}{9} \div 1\frac{1}{9} =$ .... ($\frac{8}{9}$ or $\frac{10}{9}$ or $\frac{7}{10}$ or $\frac{9}{10}$)

(12) If $5 \in \{4 + x, 3\}$, then $x =$ .... (1 or 2 or 3 or 4)

(13) The number of the altitudes in any triangle = ...
(1 or 2 or 3 or 4)

(14) If the length of the radius of a circle is 3 cm., then the length of its diameter = ... cm. (3 or 6 or 9 or 12)

2 Complete the following :

(15) The set of the digits of the number 7353 is ....

(16) $2.64 \times 0.2 =$ ....

(17) As throwing a fair die once, then the probability of appearing the number 5 is ....

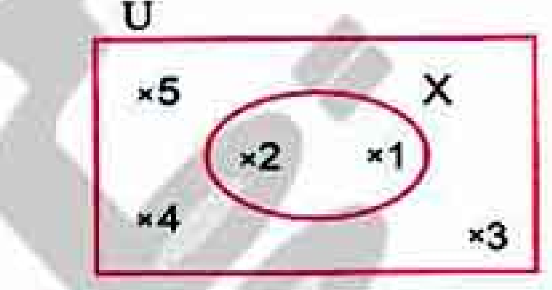
(18) 3.002 kg. = ... gm.

(19) $3\frac{1}{8} \simeq$ .... (to the nearest $\frac{1}{10}$)

(20) $\frac{14}{5} = \frac{\dots\dots}{10}$

3 Answer the following :

(21) By using the opposite Venn diagram, complete :



[a] U = ...

[b] X\` = ...

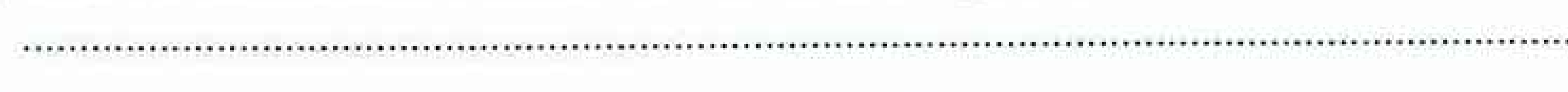
(22) **In the opposite figure :**

M and N are two circles.

Then the length $\overline{MN}$ = ... cm.



(23) Write down all the subsets for the set A = {3, 7}



(24) If X = {3, 4, 5} and Y = {5, 6}, then find : $X \cup Y =$ ....
and $X - Y =$ ....

(25) Complete :

The probability of pupil' success in an exam is $\frac{7}{10}$, then the probability of his failure is ....

(26) Draw the triangle ABC in which

AB = BC = CA = 5 cm.

10 El-Sharkia Governorate

Directorate of Education
Dep. of Governmental Formal School



Answer the following questions :

1 Choose the correct answer :

(1) $3.75 \times 100 =$ .... (0.375 or 37.5 or 375 or 0.0375)

(2) $\frac{1}{2}$ ☐ 0.3 ($<$ or $>$ or $=$ or $\leq$)

(3) $\{5\}$ .... $\{5 , 8\}$ ($\subset$ or $\not\subset$ or $\in$ or $\notin$)

(4) When tossing a coin once, the probability of appearing a tail = ...
(0 or 1 or 2 or $\frac{1}{2}$)

(5) $\frac{4}{3} \times \frac{3}{4} =$ .... (0 or 1 or 3 or 4)

(6) The number of altitudes of any triangle = ...
(1 or 2 or 3 or 4)

(7) $\{5\} - \{1 , 5\} =$ .... ($\{15\}$ or $\{5\}$ or $\{1\}$ or $\varnothing$)

(8) 3.36 km. = ... m. (3.36 or 33.6 or 336 or 3360)

(9) 43 days ≃ .... weeks. (to nearest week) (4 or 6 or 5 or 7)

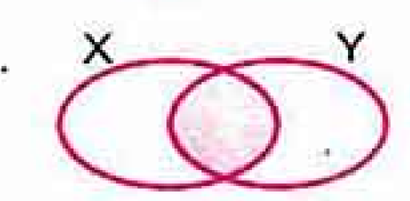
(10) If $3 \in \{x , 5\}$, then $x =$ .... (3 or 4 or 5 or 6)

(11) Any chord passing through the centre of the circle is called a ....
(diameter or radius or chord)



(12) $48.4 \div 4 =$ .... (1.21 or 0.121 or 12.1 or 121)

(13) The shaded part in the opposite figure represents ....



($X \cap Y$ or $X \cup Y$ or $X - Y$ or $Y - X$)

(14) $312 \div 10 =$ .... (3.12 or 0.312 or 31.2 or 3120)

2 Complete :

(15) If $X \subset Y$, then $X \cap Y =$ ....

(16) The probability of the sure event = ...

(17) $2.4 \times 0.7 =$ ....

(18) $4.679 \simeq$ .... (to the nearest hundredth)

(19) If $\frac{x}{8} = \frac{15}{24}$, then $x =$ ....

(20) $\frac{4}{12} \div \frac{5}{12} =$ ....

(21) A circle of diameter length = 4 cm. , then its radius length = ... cm.

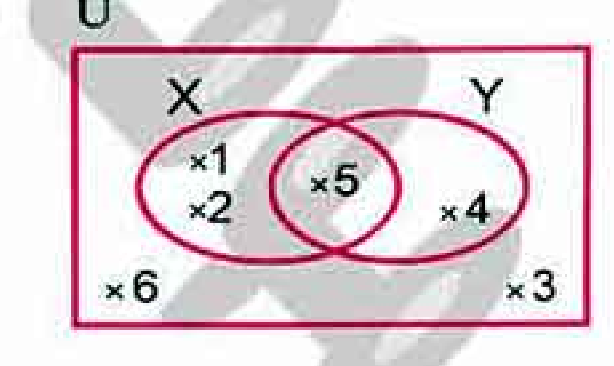
(22) If $\{1 , a\} = \{2 , b\}$, then a = ... and b = ...

3 Answer the following :

(23) An owner of packing food factory wanted to divide 5904 kilograms of sugar equally in 492 packs. What's the weight of each pack ?

....

(24) Look at the opposite Venn diagram
, then complete :



[a] $X \cup Y =$ ....

[b] $X \cap Y =$ ....

[c] $X - Y =$ ....

[d] $X` =$ ....

(25) A box contains identical balls where 5 balls are white, 3 red and 7 black, If one ball is chosen randomly, what is the probability that the chosen ball is white ?

....



(26) Draw a circle M of radius length 3 cm.
And draw the diameter $\overline{AB}$
, then find the length of $\overline{AB}$
AB = ... cm.

11 El-Monofia Governorate

Shiben El-Kom Educational Directorate
Maths Department



Answer the following questions :

1 **Choose the correct answer from those between brackets :**

(1) The number of months in half of a year = ... (6 *or* 3 *or* 5 *or* 9)

(2) The number of subsets of the set {4 , 5} equals ....
(2 *or* 3 *or* 4 *or* 9)

(3) As throwing a fair die once, then the probability of appearing the number 5 equals .... ($\frac{1}{2}$ *or* $\frac{1}{6}$ *or* $\frac{5}{6}$ *or* $\frac{2}{3}$)

(4) If $X \subset Y$, then $X - Y$ = ... (X *or* Y *or* $\varnothing$ *or* U)

(5) The number 276.5327 approximated to the nearest thousandth = ...
(277 *or* 276.533 *or* 276.54 *or* 276.5)

(6) The smallest fraction in the following is ....
($\frac{1}{3}$ *or* $\frac{5}{8}$ *or* $\frac{2}{9}$ *or* $\frac{2}{5}$)

(7) If {7 , 10} = {10 , x + 4} , then x = ... (3 *or* 4 *or* 5 *or* 6)

(8) {9} .... {99} ($\in$ *or* $\notin$ *or* $\subset$ *or* $\not\subset$)

(9) If X = {1 , 4 , 5} $\cap$ {5 , 3 , 7} , then 1 .... X ($\in$ *or* $\notin$ *or* $\subset$ *or* $\not\subset$)

(10) If {3 , 6} = {1 + x , 3} , then x = ... (2 *or* 3 *or* 4 *or* 5)

(11) To draw a circle of diameter length 12 cm. , then the opening distance of compasses should be .... cm. (12 *or* 6 *or* 9 *or* 24)

(12) If M is a circle whose diameter length is 8 cm. where MA = 7 cm. , then the point A is located .... the circle.
(inside *or* outside *or* on *or* otherwise)



(13) If $\frac{2}{5} = \frac{a}{15}$, then a = ... (6 *or* 12 *or* 9 *or* 4)

(14) The quotient of dividing 5.45 ÷ 0.5 = ...
(1.9 *or* 1.09 *or* 10.9 *or* 109)

2 Complete :

(15) 99.995 = ... (to the nearest hundredth)

(16) 5.4 tons = ... kg.

(17) $\frac{3}{8} \times \frac{2}{9}$ = ...

(18) If X ∩ Y = Y , then .... ⊂ ....

(19) The number of altitudes of the obtuse-angled triangle is ....

(20) The chord of the circle which passes through its centre is called a ....

(21) 25.25 ÷ 0.25 = ...

(22) 3.75 × 1000 = ...

3 Answer the following :

(23) Arrange the following numbers ascendingly : $\frac{1}{4}$, 0.8 , 0.4 , $\frac{1}{2}$ and $\frac{3}{4}$

....

(24) Represent the two sets A and B by a Venn diagram where
A = {1 , 2 , 3 , 6} and B = {2 , 3} , then find :

[a] A ∩ B = ...

[b] A ∪ B = ...

(25) Draw Δ XYZ which is equilateral and its side length = 4 cm.
Draw a circle of center X and radius length 4 cm.

(26) A bag contains 5 red balls, 8 black balls and 7 white balls, all of them are identical and equal in size. A ball is drawn randomly, calculate the probability that :

[a] The drawn ball is black = ...

[b] The drawn ball isn't green = ...





12 El-Gharbia Governorate

El-Gharbia Educational Directorate
Maths Supervision

Answer the following questions :

1 Choose the correct answer :

(1) 10 halves ☐ 20 quarters. (< or > or =)

(2) $35.7 \div 100 =$ .... (0.357 or 3570 or 357)

(3) The longest chord in the circle is called a ....
(radius or diameter or centre)

(4) $(A \cap B)$ .... A ($\not\subset$ or $\subset$ or $\in$)

(5) $2\frac{1}{3} \times$ .... $= 1$ ($\frac{3}{7}$ or $\frac{7}{3}$ or $2\frac{1}{2}$)

(6) $X \cap X` =$ .... ($\varnothing$ or U or X)

(7) $6.25 \div 2.5 = 62.5 \div$ .... (250 or 25 or 0.25)

(8) 2.5×53.8 ☐ 0.25×5.38 (< or > or =)

(9) $24.637 \simeq$ .... (to the nearest hundredth)
(24.64 or 24.63 or 24.6)

(10) $\{5, 7\} - \{3, 5, 8\} =$ .... ($\varnothing$ or $\{5, 3, 8\}$ or $\{7\}$)

(11) If A and B are disjoint sets, then $A - B =$ .... ($\varnothing$ or A or B)

(12) The number of altitudes in any triangle is .... (1 or 2 or 3)

(13) 538.7 cm. $\simeq$ .... m. (6 or 5.387 or 5)

(14) If $X \subset Y$, then $X \cup Y =$ .... (X or Y or $\varnothing$)

2 Complete each of the following :

(15) $3\frac{1}{2} \div \frac{7}{12} =$ ....

(16) 3.56 km. = ... m.

(17) $\{2, 4, 6\} \cap \{2, 3, 5, 7\} =$ ....

(18) A circle the length of its radius is 5 cm. , then the length of its diameter is .... cm.

(19) The probability of the impossible event = ...

(20) The altitudes of any triangle intersect at .... point(s).

(21) If $a \in \{1, 3, 5\} \cap \{2, 3, 7\}$, then a = ...

(22) $43.6 \div 4 =$ ....







3 **Answer the following :**

(23) If the price of one metre of cloth is 27.5 pounds.

What is the price of 3 metres of same kind ?

The price of 3 metres = ... = ... pounds.

(24) From the opposite Venn diagram , find by listing method :



[a] $X \cap Y =$ .... **[b]** $X \cup Y =$ ....

[c] $X - Y =$ .... **[b]** $\grave{X} =$ ....

(25) Draw Δ ABC in which AC = 5 cm.

, AB = 4 cm. and BC = 3 cm.

, then draw the altitude from B on $\overline{AC}$

(26) As throwing a fair die once, find the probability of :

[a] Appearing a prime number = ...

[b] Appearing a number less than or equal 6 = ...

[c] Appearing an even prime number = ...

[d] Appearing a number not divisible by 3 = ...

13 El-Dakahlia Governorate

Maths Supervision

Answer the following questions :

1 **Choose the correct answer :**

(1) 235 ÷ 15 = 23.5 ÷ .... (1.5 or 0.15 or 150)

(2) If $\frac{8}{9} = \frac{a}{18}$, then a = ... (4 or 16 or 27)

(3) 50 cm^2 = ... dm^2 (0.05 or 50 or 0.5)

(4) {3} .... {1 , 2 , 3} ($\in$ or $\subset$ or $\not\subset$)

(5) If the probability of pupil's success is $\frac{4}{5}$, then the probability of his failure is .... (1 or 0.2 or 0.1)

(6) 39 days ≃ .... weeks. (5 or 6 or 7)

(7) $2\frac{1}{2} \div \frac{1}{4} =$ .... (5 or 10 or 4)



2 **Complete each of the following :**

(8) The probability of the sure event is ....

(9) If $X \subset Y$, then $X \cap Y =$ ....

(10) The number of the altitudes of the right-angled triangle is ....

(11) The perimeter of a square = $\frac{1}{5}$ metre , then it's side length = ... cm.

(12) $12.5 \times$ .... $= 1.25$

(13) 15 tenths = ... tens.

3 **Choose the correct answer :**

(14) $\varnothing \cup X =$ .... ($\varnothing$ or X or U)

(15) If $\{3 , x - 1\} = \{3 , 5\}$, then $x =$ .... (6 or 4 or 3)

(16) $\frac{8}{9} >$ .... ($\frac{7}{8}$ or $\frac{9}{10}$ or $\frac{19}{20}$)

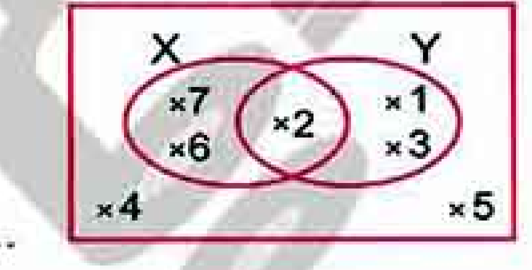
(17) The line segment whose endpoints are the centre of the circle and any point $\in$ the circle is called a ....
(chord or radius or diameter)

(18) $\{2 , 1 , 17\}$ .... the set of digits of the number 2117
($=$ or $\subset$ or $\not\subset$)

(19) If $X \subset Y$, then $X - Y =$ .... (X or Y or $\varnothing$)

(20) 25×0.1 ☐ $25 \div 0.1$ (= or > or <)

4 **Answer the following :**



(21) From the opposite figure , find by listing method :

[a] $X \cup Y =$ .... [b] $X \cap Y =$ ....

[c] $X - Y =$ .... [d] $(X \cup Y)` =$ ....

(22) A box contains 3 blue balls, 4 red balls and 5 green balls. All the balls are identical and equal in size , if a ball is drawn randomly , what is the probability that the drawn ball is :

[a] Blue ? .... [b] Not blue ? ....

[c] Blue or red ? .... [d] Black ? ....

(23) Find with steps :

$2.8905 \div 1.23 =$ .... (approximated to the nearest tenth)





(24) Ahmed bought 35 books, if the price of each book is 7.5 pounds, find the total price of all books to the nearest pound. (show the steps)

....

(25) Draw the equilateral triangle ABC whose side length = 6 cm. , then :

[a] Draw $\overline{AD} \perp \overline{BC}$

[b] Calculate the perimeter of Δ ABC

14 Ismailia Governorate

Directorate of Education
Directing of Mathematics



Answer the following questions :

1 Choose the correct answer :

(1) $\frac{4}{7}$ ☐ $\frac{2}{3}$ (< or > or =)

(2) The probability of certain event = ... ($\frac{1}{2}$ or 0 or 1 or $\frac{1}{4}$)

(3) Any triangle has .... altitudes. (0 or 1 or 2 or 3)

(4) $\varnothing$ .... {5 , 6} ($\in$ or $\notin$ or $\subset$ or $\not\subset$)

(5) 8 halves = 20 fifths (✓ or ✗)

(6) If $X \subset Y$, then $X \cap Y$ = ... (X or Y or $\varnothing$ or U)

(7) If {7 , 10} $\subset$ {10 , $x + 4$} , then x = ... (3 or 4 or 6 or 10)

(8) If $\frac{6}{8} < \frac{x}{8} < 1$, then x = ... (1 or 7 or 8 or 6)

(9) The smallest fraction of the following is ....
($\frac{1}{2}$ or $\frac{1}{3}$ or $\frac{1}{4}$ or $\frac{1}{5}$)

(10) To draw a circle with diameter 6 cm. , we open the compasses .... cm. (6 or 3 or 12 or 2)

(11) 6.8 kg. = ... gm. (680 or 6080 or 7 or 6800)

(12) 48.37 ÷ .... = 4.837 (10 or 100 or 1000 or 10000)

(13) $\frac{2}{3}$ ÷ .... = 1 ($\frac{2}{3}$ or $\frac{3}{2}$ or 1 or $\frac{5}{6}$)

(14) If $\frac{3}{6} = \frac{4}{x}$, then x = ... (3 or 27 or 8 or 6)

2 Complete :

(15) $2.83 \times 1000 =$ ....

(16) $6.3729 \simeq$ .... (to the nearest $\frac{1}{1000}$)

(17) $2.3 \times 0.32 =$ ....

(18) $6\frac{3}{8} \simeq$ .... (to the nearest $\frac{1}{100}$)

(19) If U = {0 , 1 , 2 , 3 , 4} and A = {1 , 3 , 4} , then À = ...

(20) The reciprocal of $1\frac{2}{7}$ is ....

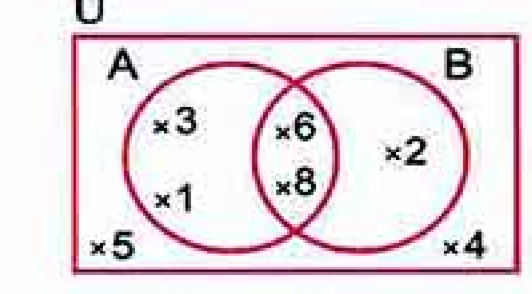
(21) The longest chord in a circle is called ....

(22) The line segment that joining between the centre of a circle and any point on a circle is called ....

3 Answer the following :

(23) $1\frac{2}{3} \times \frac{1}{10} =$ ....

(24) Use the opposite Venn diagram to find :



[a] $A \cap B =$ ....

[b] $B - A =$ ....

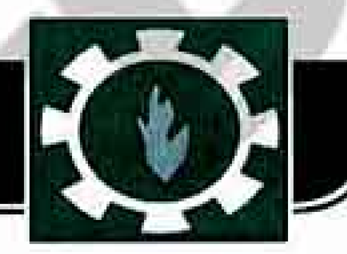
(25) A bag contains 3 white balls , 5 yellow balls and 2 red balls , a ball is drawn randomly , find the probability that the drawn ball is :

[a] White = ... **[b]** Yellow or red = ...

(26) Draw ABC isoscles triangle in which AB = AC = 5 cm. , BC = 6 cm. and draw $\overline{AD}$ perpendicular to $\overline{BC}$, then find by measuring the length of $\overline{AD}$

15 Suez Governorate

South Educational Directorate
Maths Inspection



Answer the following questions :

1 Choose the correct answer :

(1) 55.241×100 ☐ 552.41×10 (> or = or <)





(2) $3\frac{1}{2} \div \frac{7}{12} =$ .... (6 or $\frac{49}{24}$ or 4)

(3) 3 .... {303.13} ($\in$ or $\subset$ or $\notin$)

(4) Any triangle has .... altitudes. (1 or 3 or 2)

(5) The longest chord in a circle is called a ....
(diameter or radius or chord)

(6) If $\{x + 1 , 5\} = \{6 , 5\}$, then $x =$ .... (6 or 1 or 5)

(7) 85.67 – 67.5 = ... (18.17 or 22.2 or 22.17)

(8) 276.532 ≃ .... (to the nearest hundredth)
(277 or 276.53 or 276.5)

(9) If $X \subset Y$, then $X \cup Y =$ .... (X or Y or $\varnothing$)

(10) The number of subsets of {4 , 5} equals .... (3 or 4 or 5)

(11) The probability of the sure event is .... (0 or $\frac{1}{2}$ or 1)

(12) 225 ÷ 25 = 2.25 ÷ .... (0.25 or 2.5 or 25)

(13) 572.4 cm. ≃ .... metres. (572 or 6 or 60)

(14) The shaded part of [X, Y diagram] represents ....
($X \cap Y$ or $Y - X$ or $X - Y$)

2 Complete :

(15) 3.75 × 1000 = ...

(16) If ΔABC is equilateral of side length 6 cm. , then its perimeter = ... cm.

(17) $\{3 , 2 , 4\} \cap \{13 , 4 , 20\} =$ ....

(18) If U = {1 , 2 , 3 , 4 , 5} and A = {2 , 4} , then $\grave{A} =$ ....

(19) Half of a year = ... months.

(20) 39.76 ≃ .... (to the nearest unit)

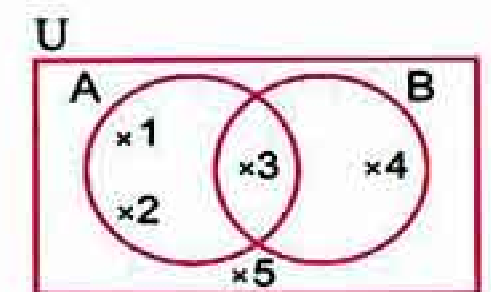
(21) If the length of longest chord in the circle is 10 cm.
, then its radius length = ... cm.

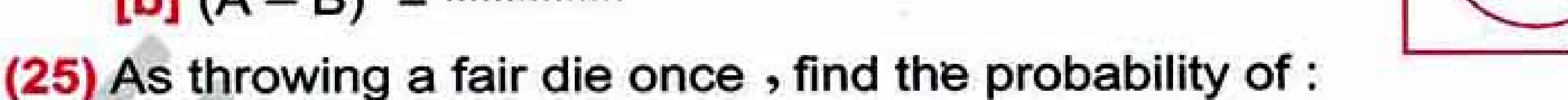
(22) As tossing a coin once , then the probability of appearing a head is ....

3 Answer the following :

(23) Arrange in an ascending order : $3\frac{1}{4}$, 3.3 , 3.125 and $3\frac{1}{2}$

....





(24) From the opposite figure , find :

[a] $A \cap B =$ ....

[b] $(A - B)` =$ ....



(25) As throwing a fair die once , find the probability of :

[a] Appearing a number greater than 6 = ...

[b] Appearing the number 5 = ...

(26) Draw Δ ABC in which AB = 7 cm.
, BC = 6 cm. and AC = 5 cm.

16 Damietta Governorate

Mathematics Inspection

Answer the following questions :

1 Choose the correct answer :

(1) 25.6745 ≃ .... (to the nearest thousandth)
(25.674 *or* 25.675 *or* 25.67 *or* 25.68)

(2) 35.2694 pounds = ... piastres.
(0.352694 *or* 3.52694 *or* 35.2694 *or* 3526.94)

(3) The set of prime numbers more than 30 is .... set.
(a finite *or* an infinite *or* an empty *or* otherwise)

(4) Any chord passing through the centre of a circle is called ....
(a diameter *or* a radius *or* a chord *or* otherwise)

(5) $2\frac{5}{7}$ ☐ $2\frac{3}{5}$ (> *or* = *or* ≥ *or* <)

(6) $4\frac{1}{8} \times 2\frac{2}{3} =$ .... (1 *or* 10 *or* 11 *or* 111)

(7) If $\frac{x}{8} = \frac{15}{24}$, then $x =$ .... (24 *or* 15 *or* 3 *or* 5)

(8) $\frac{1}{8} \div 0.5 =$ .... (0.025 *or* 0.25 *or* 2.5 *or* 25)

(9) 23.21 ÷ 1000 = ... (232.1 *or* 2.321 *or* 0.2321 *or* 0.02321)

(10) 0.3 × 0.3 × 0.3 = ... (0.027 *or* 0.27 *or* 2.7 *or* 27)

(11) ∅ .... {8 , 7 , 5} (∈ *or* ∉ *or* ⊂ *or* ⊄)





(12) $Y = \{2, 4, 6\} \cup \{1, 2, 3\}$, then 6 .... Y

($\in$ *or* $\notin$ *or* $\subset$ *or* $\not\subset$)

(13) The number of subsets for the set $\{5, 6\}$ is ....

(1 *or* 2 *or* 3 *or* 4)

(14) If M is a circle whose diameter length is 6 cm. where MA = 5 cm. , then the point A is located .... the circle.

(inside *or* outside *or* on *or* otherwise)

2 Complete the following :

(15) The probability of the sure event = ...

(16) $3\frac{1}{8} \div 2\frac{1}{2} =$ ....

(17) $\frac{5}{8} \simeq$ .... (to the nearest hundredth)

(18) The greatest fraction from the following $\frac{1}{4}$, $\frac{1}{5}$ and 0.23 is ....

(19) If $7 \in \{3, 3 + x\}$, then $x =$ ....

(20) If $U = \{1, 2, 5\}$, $X = \{5\}$, then $X' =$ ....

(21) The number of altitudes of the obtuse angled-triangle = ...

(22) To draw a circle of diameter length 6 cm. , then the opening distance of the compasses = ...

3 Answer the following :

(23) An owner of packing food factories wanted to pack 5405 kilograms of sugar equally in 235 packs. What is the weight of each pack ?

....

(24) Look at the opposite Venn diagram , then find the following :



[a] $X - Y =$ ....

[b] $X \cap Y =$ ....

(25) A bag contains 5 white balls , 9 red balls and 6 black balls , if one ball is chosen randomly. What is the probability that the chosen ball is :

[a] White ? .... **[b]** Red or black ? ....

(26) Draw the triangle XYZ where $XY = XZ = 5$ cm. and $YZ = 6$ cm. , then draw $\overline{XD} \perp \overline{YZ}$ that intersects $\overline{YZ}$ at D





17 Kafr El-Sheikh Governorate

Maths Inspection

Answer the following questions :

1 Complete :

(1) $1.775 \times 0.15 \simeq$ .... (to the nearest hundredth)

(2) The probability of the sure event = ...

(3) If $\frac{2}{3} = \frac{16}{a}$, then a = ...

(4) The number of all the subsets of the set {2 , 6} is ....

(5) $5\ \frac{1}{2} \div 3\ \frac{2}{3} =$ ....

(6) The longest chord in the circle is called ....

(7) If {a , 5 , 8} = {b , 4 , 8} , then (a + b) = ...

(8) If X = Y , then X – Y = ...

2 Choose the correct answer :

(9) $4\ \frac{1}{8} \times 2\ \frac{2}{3} =$ .... (0 or 10 or 11 or 111)

(10) {73} .... {7 , 3} ($\in$ or $\notin$ or $\subset$ or $\not\subset$)

(11) The number of altitudes of any triangle is ....
(0 or 1 or 2 or 3)

(12) In a class there are 40 pupils, 25 of them are boys and the rest is girls.
The probability of choosing a girl = ... ($\frac{3}{8}$ or $\frac{5}{8}$ or $\frac{3}{5}$ or 1)

(13) 155.241 × 100 ☐ 522.4 × 10 (< or > or = or ≤)

(14) A circle of radius length 4 cm. , then its diameter length = ... cm.
(1 or 2 or 4 or 8)

(15) If X = {2 , 5 , 6} ∩ {3 , 5} , then X .... {3 , 5}
($\in$ or $\notin$ or $\subset$ or $\not\subset$)

(16) If {7 , 10} ⊂ {10 , x + 4 , 5} , then x = ...
(10 or 7 or 5 or 3)

(17) 43 days ≃ .... weeks. (to the nearest week) (5 or 6 or 7 or 8)

(18) m .... {maths} ($\in$ or $\notin$ or $\subset$ or $\not\subset$)





(19) $4.25 \div$ .... $= 8\frac{1}{2}$ (2 **or** 12.75 **or** $\frac{1}{4}$ **or** 0.5)

(20) 2.4 dm. = ... cm. (240 **or** 24 **or** 0.24 **or** 0.024)

(21) $37440 \div 234 =$ .... (16 **or** 106 **or** 160 **or** 1600)

(22) If $6 \in \{3, 5, 2x\}$, then $x =$ .... (2 **or** 3 **or** 4 **or** 5)

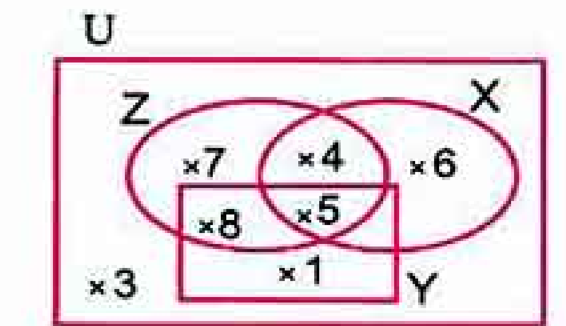
3 **Answer the following :**

(23) The area of a rectangle = 10.25 m^2 and its length is 4.1 m.
Find the width and the perimeter of this rectangle.

....

....

(24) Look at the opposite figure , then complete :



[a] $X \cup Y =$ ....

[b] $Z \cap Y =$ ....

[c] $X - Z =$ ....

[d] $(Z \cup X)' =$ ....

(25) Arrange the following fractions in an ascending order :

0.6 , $\frac{2}{5}$, 0.8 and $\frac{3}{4}$

The order is : .... , ... , ... and ....

(26) Draw Δ ABC in which AB = 3 cm.
, BC = 4 cm. and AC = 5 cm.
M is the midpoint of $\overline{AC}$
, then draw a circle M
with radius length 2.5 cm.

....

....

18 El-Beheira Governorate

Bandr Damnhour Educational Zone
Ismail El-Habrouk G.L.S.



Answer the following questions :

1 **Choose the correct answer :**

(1) The shaded part of  represents ....

($X \cap Y$ **or** $X \cup Y$ **or** $X - Y$ **or** $Y - X$)



(2) There are .... altitudes in the right-angled triangle. (0 or 1 or 2 or 3)

(3) $3.75 \times 1000 =$ .... (0.375 or 0.0375 or 3750 or 37.5)

(4) 2.4 dm. = ... cm. (0.24 or 24 or 240 or 2400)

(5) $\{23\}$ .... $\{2 , 3\}$ ($\in$ or $\notin$ or $\subset$ or $\not\subset$)

(6) $3\frac{1}{8} \simeq$ .... (to the nearest hundredth) (3.125 or 3.12 or 3.13 or 3.1)

(7) If $\{5 , 7\} = \{7 , x + 2\}$, then $x =$ .... (3 or 4 or 5 or 6)

(8) 24.551×100 ☐ 22.541×10 (> or < or =)

(9) Any chord passing through the centre of a circle is called a .... (diameter or radius or chord)

(10) $4\frac{1}{8} \times 2\frac{2}{3} =$ .... (1 or 10 or 11 or 111)

(11) $0.067 \times 1000 =$ .... (6.7 or 67 or 0.067 or 670)

(12) $1.7 \div 10 =$ .... (17 or 0.17 or 1.7 or 0.017)

(13) $2.125 \div 0.25 =$ .... $\div 25$ (212.5 or 21.25 or 2125 or 21250)

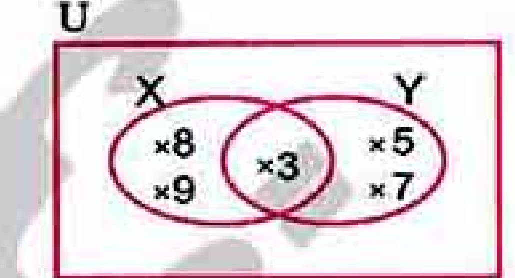
(14) The number of subsets of set $\{5\}$ is .... (0 or 1 or 2 or 3)

2 Complete :

(15) If $X \subset Y$, then $X \cap Y =$ ....

(16) **From the opposite figure :**

$X - Y =$ ....

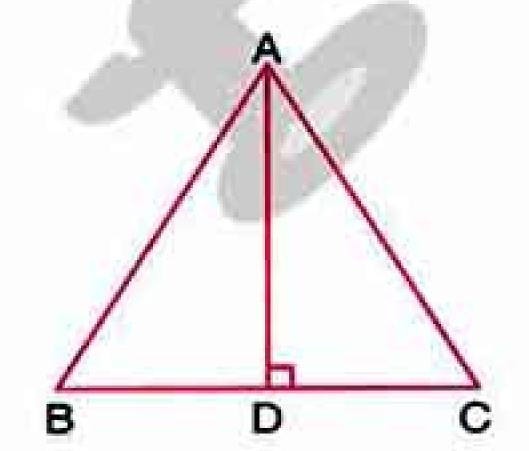


(17) When tossing a coin once , the probability of getting a head = ...

(18) $4.6789 \simeq$ .... (to the nearest thousandth)

(19) **From the opposite figure :**

$\overline{AD}$ is called ....



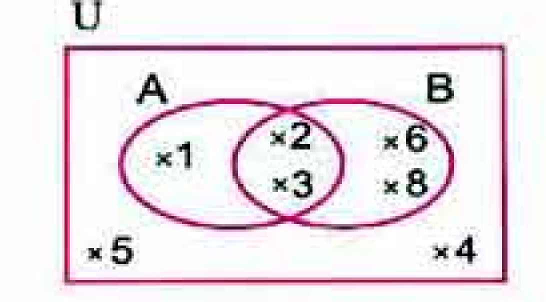
(20) If $\frac{4}{8} = \frac{x}{24}$, then $x =$ ....

(21) $\frac{1}{2} \div \frac{1}{12} =$ ....

(22) .... $\times \frac{4}{5} = 1$



3 Answer the following :



(23) From the opposite Venn diagram , find :

[a] $A \cap B =$ ....

[b] $\grave{A} =$ ....

(24) A box contains identical balls where 5 are white, 9 are red and 6 are black.If one ball is chosen randomly, what is the probability that :

[a] The chosen ball is white ? ....

[b] The chosen ball is not black ? ....

(25) A truck can hold 125 boxes of oranges at a time. How many times are needed to deliver 4375 boxes by that truck ? (show steps)

....

(26) Draw ABC triangle in which

BC = 6 cm. and AB = AC = 5 cm.

Draw $\overline{AD} \perp \overline{BC}$ and find its length.

19 Beni Suef Governorate

Samsta Educational Directorate
Maths Supervision



Answer the following questions :

1 Choose the correct answer :

(1) The probability of the impossible event = ...
(∅ or zero or 1 or $\frac{1}{3}$)

(2) The number of the altitudes of the triangle = ...
(0 or 1 or 2 or 3)

(3) If $X \subset Y$, then $X \cap Y =$ .... (X or Y or ∅ or U)

(4) $46.432 \simeq 46.43$ approximated to the nearest ....
(ten or 0.1 or 0.01 or 0.001)

(5) If $\{3 , 4\} = \{1 + y , 3\}$, then y = ... (7 or 4 or 2 or 3)

(6) 40 days ≃ .... weeks. (4 or 6 or 5 or 7)

(7) 17.947 ≃ .... (to the nearest hundredth)
(17.948 or 17.95 or 17.90 or 17.94)



(8) {2 , 3} .... {5 , 7 , 8} (∈ or ∉ or ⊂ or ⊄)

(9) 95.3 × 100 = ... (0.953 or 953 or 9530 or 9.53)

(10) As throwing a die once, then the probability of appearing a number less than 3 = ... ($\frac{1}{6}$ or $\frac{1}{2}$ or $\frac{1}{3}$ or $\frac{2}{5}$)

(11) 1.7 ÷ 10 = ... (17 or 0.17 or 1.7 or 0.017)

(12) 254 hours ≃ .... days. (11 or 10 or 12 or 9)

(13) The chord which passes through the centre of the circle is called .... (a diameter or a radius or a centre or a side)

(14) 255 ÷ 25 = 2.55 ÷ .... (2.5 or 0.25 or 25 or 2500)

2 Complete the following :

(15) If {8 , 6 , 7} = {x , 8 , 7} , then x = ...

(16) 7.64 × 0.93 ≃ .... (to the nearest thousandth)

(17) The midpoint of any diameter in a circle is .... of the circle.

(18) 57.35 + 21.53 = ... ≃ .... (to the nearest tenth)

(19) {2 , 3 , 6 , 12} ∩ the set of factors of the number 6 = ...

(20) If 6 ∈ {3 , 5 , 2 x} , then x = ...

3 Answer the following :

(21) 6.7898 – 4.247 = ... ≃ .... (to the nearest thousandth)

(22) $\frac{5}{7} \times 1\frac{2}{5}$ = ...

(23) 7885 ÷ 1000 = ...

(24) 26272 ÷ 821 = ...

(25) What is the number which is multiplied by 0.5 the product will be 33.86 ?

....

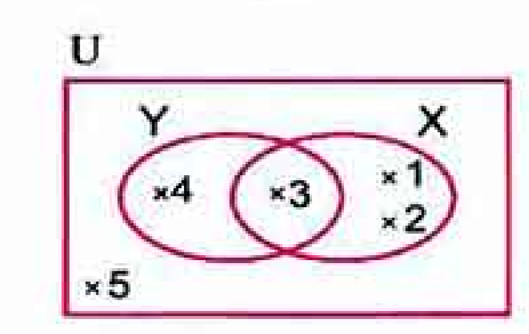
(26) Look at the opposite Venn diagram and find :

[a] X ∩ Y = ...

[b] X ∪ Y = ...

[c] X – Y = ...

[d] Y` = ...







(27) Draw the triangle ABC in which

AB = BC = 6 cm. and m (∠ B) = 120°

, then draw $\overline{AD} \perp \overleftrightarrow{BC}$ which intersects it at D

, then find the length of $\overline{AD}$

(28) A bag contains 3 white balls, 7 red balls and 5 yellow balls.

All the balls are equal in size. If a ball is drawn randomly.

[a] What is the probability that the drawn ball is white ? ....

[b] What is the probability that the drawn ball is not red ? ....

(29) A car covers equal distances in equal times. If this car covered 24.73 km. in one hour, how many km. are covered in 2 $\frac{1}{2}$ hours ?

....

(30) A metal coin was thrown once, find the probability of appearing a head.

....

20 El-Menia Governorate

El-Menia Official Language School
Maths Department



Answer the following questions :

1 Choose the correct answer :

(1) 5.421 × 100 ☐ 52.41 × 10 (> or = or < or ≤)

(2) If X ⊂ Y , then X ∩ Y = ... (U or X or Y or ∅)

(3) {3 , 7} .... {1 , 3 , 7} (∈ or ∉ or ⊂ or ⊄)

(4) The chord which passes through the centre of a circle is called .... (diameter or radius or centre or side)

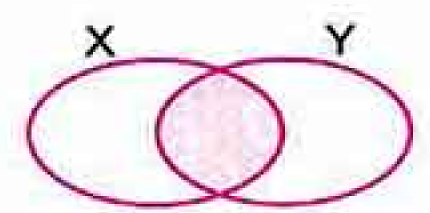
(5) A ∩ À = ... (A or U or ∅ or À)

(6) Every triangle has .... altitudes. (1 or 2 or 3 or 4)

(7) 312 ÷ 10 = ... (3.12 or 0.312 or 31.2 or 3120)

(8) When tossing a coin once , the probability of appearing a tail = ... (1 or $\frac{1}{2}$ or $\frac{1}{3}$ or $\frac{1}{4}$)





(9) The shaded part in the opposite figure represents ....

(X ∩ Y **or** X ∪ Y **or** X − Y **or** Y − X)

(10) The probability of sure event = ... (0 **or** $\frac{1}{2}$ **or** 1 **or** 2)

(11) 0.3 × 0.2 = ... (0.6 **or** 0.06 **or** 0.006 **or** 6)

(12) 82.487 ≃ 82.5 to the nearest ....

(tenth **or** unit **or** hundredth **or** thousandth)

(13) $4 \times \frac{1}{4}$ = ... (1 **or** 4 **or** 8 **or** 16)

(14) $\frac{1}{2}$ ☐ $\frac{1}{3}$ (< **or** > **or** = **or** ≤)

2 Complete each of the following :

(15) If $\frac{2}{5} = \frac{a}{15}$, then a = ...

(16) 3.002 kg. = ... gm.

(17) If 4 ∈ {3 , x , 5} , then x = ...

(18) 36.274 + 33.28 = ... ≃ .... (to the nearest $\frac{1}{100}$)

(19) $\frac{4}{12} \div \frac{6}{12}$ = ...

(20) A circle which its diameter length is 10 cm. , the length of its radius is .... cm.

(21) 4.5 ÷ 0.5 = ...

(22) 12.5 − 3.75 ≃ .... (to the nearest $\frac{1}{10}$)

3 Answer the following :

(23) Draw Δ ABC in which

AB = 7 cm. , BC = CA = 6 cm.

, then draw the line segment from C

that is perpendicular to $\overline{AB}$

and find its length.



(24) From the opposite figure , find :

[a] $X \cup Y =$ ....

[b] $X \cap Y =$ ....

[c] $X - Y =$ ....

[d] $(X \cup Y)' =$ ....



(25) Arrange in an ascending order :

$$0.6 \;,\; \frac{1}{2} \;,\; 0.8 \text{ and } \frac{3}{4}$$

The order is : .... , ... , ... and ....

(26) A box contains 5 white balls, 9 red balls and 6 black balls , all the balls are identical and equal size, if a ball is drawn randomly , what is the probability that the drawn :

[a] White ? .... **[b]** Red ? ....

21 Souhag Governorate

Maths Supervision



Answer the following questions :

1 Choose the correct answer :

(1) 2 .... {5 , 2 , 52} ($\in$ or $\notin$ or $\subset$ or $\not\subset$)

(2) $\frac{1}{8} \simeq$ .... (to the nearest hundredth)
(0.125 or 0.12 or 0.13 or 1.0)

(3) 806.7 ÷ 100 = ... (80.67 or 8.067 or 80670 or 8067)

(4) 98.7 × 1000 = ... (987.0 or 0.987 or 98700 or 9870)

(5) $\varnothing$ .... {0} ($\in$ or $\notin$ or $\subset$ or $\not\subset$)

(6) $\frac{1}{2}$ ☐ $\frac{1}{3}$ (< or > or = or ≤)

(7) 3.36 km. = ... m. (3.36 or 33.6 or 336 or 3360)

(8) If $6 \in \{3 , 5 , 2x\}$, then $x =$ .... (2 or 3 or 4 or 5)

(9) $\frac{5}{6} + \frac{2}{6} =$ .... ($\frac{5}{7}$ or $\frac{7}{12}$ or $\frac{7}{6}$ or $\frac{3}{7}$)

(10) $9\frac{3}{25} \simeq$ .... (to the nearest tenth) (0.9 or 9.2 or 9.1 or 9)

(11) A circle with a diameter length 8 cm. , then the length of its radius = ... cm. (4 or 5 or 6 or 16)



(12) The number of the altitudes in any triangle = ...

(1 *or* 2 *or* 3 *or* 0)

(13) 48.2×3.7 ☐ 4.82×37 ($<$ *or* $>$ *or* $=$ *or* $\neq$)

(14) The number $83.7694 \simeq 83.77$ to the nearest ....

($\frac{1}{10}$ *or* $\frac{1}{100}$ *or* $\frac{1}{1000}$ *or* $\frac{1}{10000}$)

2 Complete each of the following :

(15) .... $\times 2\frac{1}{5} = 1$

(16) The longest chord in a circle is called ....

(17) The probability of the sure event = ...

(18) $3\frac{1}{4} \times \frac{2}{3} =$ ....

(19) The chord which passes through the centre of the circle is called ....

(20) $478.347 - 134.834 =$ ....

(21) $\{1, 2\} \cup \{2, 3, 4\} =$ ....

(22) $\{5, 6\} \cap \{4, 5\} =$ ....

3 Answer the following questions :

(23) Using the opposite Venn diagram , find :

U: Y = {3, 4, 2}, X = {2, 5, 1}, outside: 6

[a] $X \cup Y =$ ....



[b] $X \cap Y =$ ....

[c] $\grave{X} =$ ....

[d] $X - Y =$ ....

(24) If the price of a piece of sweet is 2.25 pounds, what is the price of 25 pieces of the same kind ?

....

(25) Draw the triangle ABC where

AB = 4 cm. , BC = 5 cm.

and CA = 6 cm.

(26) A box contains 5 white balls, 4 blue balls and 2 red balls, find the probability of getting :

[a] A blue ball = ... **[b]** A red ball = ...



22 Qena Governorate

Qaft Educational Zone
Qaft Language School



Answer the following questions :

1 Complete :

(1) $4.526 \times 100 =$ ....
(2) The longest chord in the circle is called ....
(3) $\frac{3}{7} \div \frac{1}{2} =$ ....
(4) $62.345 + 15.632 =$ .... $\simeq$ .... (to the nearest hundredth)
(5) $4.32 \times 3.6 =$ ....
(6) If $A \subset B$, then $A \cup B =$ ....
(7) $4.8 \div 10 =$ ....
(8) The probability of the impossible event = ...
(9) $5\frac{2}{3} \times \frac{3}{17} =$ ....
(10) The number of altitudes of a triangle = ...

2 Choose the correct answer :

(11) $\frac{1}{3} \times 3 =$ .... (3 or $\frac{1}{9}$ or 1 or 6)
(12) $0.06 \times 0.3 =$ .... (18 or 0.018 or 0.18 or 0.09)
(13) $\{23\}$ .... $\{2 , 3\}$ ($\in$ or $\notin$ or $\subset$ or $\not\subset$)
(14) A letter is selected randomly from the word "Ahmed" , the probability of selecting the letter A is .... ($\frac{1}{5}$ or $\frac{2}{5}$ or $\frac{3}{5}$ or $\frac{4}{5}$)
(15) $62.38 \div 10 =$ .... (623.8 or 62380 or 6.238 or 6238)
(16) $X \cup \grave{X} =$ .... (X or $\grave{X}$ or U or $\grave{U}$)
(17) $\frac{4}{7}$ ☐ $\frac{5}{9}$ (< or = or >)
(18) If $7 \in \{3 , 5 , x\}$, then $x =$ .... (3 or 5 or 7 or 8)
(19) 4 .... the set of digits of the number 3456 ($\in$ or $\notin$ or $\subset$ or $\not\subset$)
(20) The set of even numbers between 6 and 34, then its type is .... (finite or infinite or empty)



(21) A circle of diameter length 6 cm. , then its radius length = ... cm.
(6 **or** 12 **or** 3 **or** 2)

(22) A bag has 5 red balls and 3 white balls , if a ball is drawn randomly , then the probability that the drawn ball is white = ...
($\frac{3}{5}$ **or** $\frac{3}{8}$ **or** $\frac{5}{8}$ **or** $\frac{5}{3}$)

(23) 0.74 × 1000 = ... (740 **or** 74 **or** 74000 **or** 0.074)

(24) If $\{3 , 6 , x\} = \{6 , 2 , 3\}$, then x = ... (3 **or** 6 **or** 9 **or** 2)

(25) 36.36 ÷ 9 = ... (44 **or** 4.4 **or** 40.4 **or** 4.04)

(26) If $A \subset B$, then $A \cap B$ = ... (A **or** À **or** B **or** B̀)

3 **Answer the following :**

(27) Draw the circle M of radius length 4 cm.
, then draw the diameter $\overline{AB}$
and the chord $\overline{AC}$ = 6 cm.

(28) Find the result of :
24.581 ÷ 5.23 = ...

23 Luxor Governorate

Luxor Educational Directorate
Maths Department



Answer the following questions :

1 **Choose the correct answer :**

(1) If $7 \in \{3 , x , 5\}$, then x = ... (3 **or** 8 **or** 5 **or** 7)

(2) 76.518 ≃ .... (to the nearest hundredth)
(76.52 **or** 765.2 **or** 76.5 **or** 7652)

(3) $\frac{3}{4}$ ☐ $\frac{2}{3}$ (> **or** < **or** =)

(4) 5.748 × 100 = ... (57.48 **or** 0.5748 **or** 574.8 **or** 5748)

(5) The longest chord in the circle is called ....
(radius **or** diameter **or** chord **or** centre)

(6) $\varnothing$ .... {2 , 5} ($\in$ **or** $\notin$ **or** $\subset$ **or** $\not\subset$)



(7) $\frac{4}{5} \times \frac{1}{3} =$ .... ($\frac{1}{2}$ or $\frac{12}{5}$ or $\frac{4}{15}$ or $\frac{5}{8}$)

(8) 537.1 ÷ 10 = ... (5371 or 53.71 or 5.371 or 0.5371)

(9) If X = {2 , 3 , 5} and Y = {4 , 3 , 6} , then X ∩ Y = ...

({5} or {5 , 2} or {3} or {5 , 6})

(10) Any triangle has .... altitudes. (5 or 2 or 3 or 1)

(11) 0.1 × 0.3 = ... (0.4 or 0.3 or 0.13 or 0.03)

(12) 5 .... {1 , 5 , 3 , 7} (∈ or ∉ or ⊂ or ⊄)

(13) $\frac{2}{5} \div \frac{1}{4} =$ .... ($\frac{8}{5}$ or $\frac{6}{5}$ or $\frac{5}{8}$ or $\frac{2}{3}$)

(14) {2 , 5 , 6} – {6 , 5 , 3} = ... ({5} or {5 , 6} or {3} or {2})

2 Complete the following :

(15) 15.3689 – 12.1564 = ... ≃ .... (to the nearest thousandth)

(16) The altitudes of the acute-angled triangle intersect .... the triangle.

(17) The probability of getting a head when tossing a coin once is ....

(18) 16.78 ÷ 100 = ...

(19) If X = {2 , 7 , 5} and Y = {3} , then X ∪ Y = ...

(20) A circle its diameter length is 8 cm. , then its radius length is .... cm.

(21) 3 × 0.4 = ...

(22) {3 , 5 , 8} – {1 , 5 , 3 , 6 , 8} = ...

3 Answer the following :

(23) 3.148 + 5.231 = ... ≃ .... (to the nearest hundredth)

(24) If a die is tossed once, find the probability of :

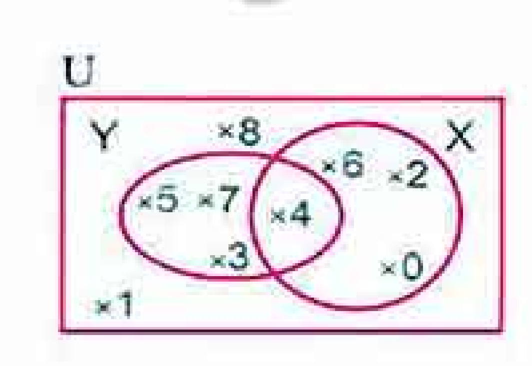
[a] Getting an even number = ...

[b] Getting a number greater than 7 = ...

(25) Use the opposite Venn diagram to find :

[a] Y ∩ X = ...

[b] Y` = ...

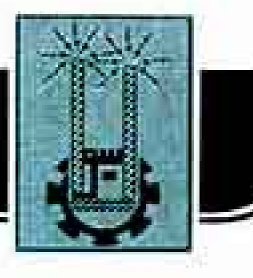




(26) Draw the equilateral triangle ABC where each side is equal to 3 cm. , and draw an altitude from the vertex C perpendicular to $\overline{AB}$

24 Aswan Governorate

Aswan Educational Directorate
M. M.Yaqoub Language School



Answer the following questions :

1 **Choose the correct answer :**

(1) 4.763 ≃ .... (to the nearest hundredth) (4.77 or 4.7 or 4.76 or 4.764)

(2) $X \cap X'$ = ... (X or X` or U or ∅)

(3) $\frac{5}{7}$ ☐ $\frac{5}{6}$ (< or = or > or ≥)

(4) 9.82 × 1000 = ... (98.2 or 0.982 or 9820 or 982)

(5) 1.8 × 5 = ... (9 or 9.5 or 1.85 or 18.5)

(6) $\frac{1}{4} \times \frac{2}{3}$ = ... ($\frac{3}{8}$ or $\frac{1}{6}$ or $\frac{2}{7}$ or $\frac{3}{7}$)

(7) 5.8 ÷ 10 = ... (5800 or 580 or 58 or 0.58)

(8) If $X \subset Y$, then $X \cap Y$ = ... (X or Y or ∅ or $X \cup Y$)

(9) $\frac{1}{2} \div \frac{1}{4}$ = ... ($\frac{1}{8}$ or 4 or 2 or 8)

(10) {35} .... {1 , 3 , 5} (∈ or ∉ or ⊂ or ⊄)

(11) If {4 , 7} = {x , 4} , then x = ... (4 or 7 or 3 or 47)

(12) A circle with diameter length 6 cm. , then its radius length = ... cm. (6 or 4 or 12 or 3)

(13) If 5 ∈ {3 , 4 + x} , then x = ... (1 or 3 or 4 or 5)

(14) If $\frac{2}{5} = \frac{x}{10}$, then x = ... (2 or 4 or 5 or 8)

2 **Complete :**

(15) The longest chord in a circle is called ....

(16) {2 , 5} ∪ {7 , 5} = ...





(17) When tossing a die once, the probability of getting a number 5 is ....

(18) $\frac{3}{4} \div \frac{3}{8} =$ ....

(19) The number of altitudes of any triangle = ...

(20) The probability of the certain event = ...

(21) The sum of the measures of the interior angles of any triangle = ... °

(22) 0.35 kg. = ... gm.

3 **Answer the following :**

(23) A box contains 3 white balls, 7 red balls and 5 yellow balls, all of equal size, one ball is chosen randomly. Find the probability of choosing :

[a] A white ball = ...

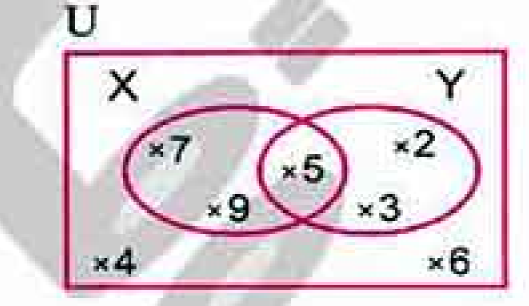
[b] Not yellow ball = ...

(24) Draw the equilateral triangle ABC whose side length = 5 cm.
, then draw $\overline{CD} \perp \overline{AB}$

(25) If the price of a piece of sweet is 2.25 pounds, what is the price of 5 pieces of the same kind ?

The price = ... = ... pounds.

(26) From the opposite figure, find :



[a] $\grave{X}$ = ...

[b] Y – X = ...

25 South Sinai Governorate

Sinai Educational Zone
Maths Inspection



Answer the following questions :

1 **Choose the correct answer :**

(1) 98.7 × 100 = ... (9.87 *or* 987 *or* 9870 *or* 0.987)



(2) 736.592 ≃ 736.59 approximated to the nearest ....
(unit **or** tenth **or** hundredth **or** thousandth)

(3) If $\{2, 3, 4\} = \{3, 4, x\}$, then $x =$ .... (1 **or** 2 **or** 3 **or** 4)

(4) Any chord passes through the centre of the circle is called a ....
(straight line **or** diameter **or** radius **or** ray)

(5) 11664 ÷ 216 = ... (50 **or** 54 **or** 58 **or** 62)

(6) $\{5\} - \{1, 2, 5\} =$ .... ($\{5\}$ **or** $\{1\}$ **or** $\{1, 2\}$ **or** $\varnothing$)

(7) 37.4289 – 14.081 ≃ .... (to the nearest thousandth)
(23.349 **or** 23.350 **or** 23.348 **or** 23.248)

(8) If $X \subset Y$, then $X \cap Y =$ .... (X **or** $\{0\}$ **or** Y **or** $\varnothing$)

(9) The number of altitudes of any triangle is ....
(1 **or** 2 **or** 3 **or** 4)

(10) $\{1, 7\}$ .... $\{0, 1, 2, 3, 4, ...\}$ ($\in$ **or** $\notin$ **or** $\subset$ **or** $\not\subset$)

(11) 75.3 ÷ 100 = ... (7530 **or** 753 **or** 7.53 **or** 0.753)

(12) $\frac{1}{2}$ ☐ $\frac{1}{3}$ ($\le$ **or** $<$ **or** $>$ **or** $=$)

(13) 5.45 ÷ 0.5 = ... (1.9 **or** 19 **or** 1.09 **or** 10.9)

(14) The number of subsets of the set $\{5\}$ is ....
(0 **or** 1 **or** 2 **or** 3)

2 **Complete the following :**

(15) 2.4 dm. = ... cm.

(16) $\frac{1}{3} \times \frac{2}{5} = \frac{\cdots\cdots}{\cdots\cdots}$

(17) A circle whose diameter length is 4 cm., then the length of its radius is .... cm.

(18) $\{1, 2, 4\} - \{2, 4, 6\} =$ ....

(19) If $\frac{b}{8} = \frac{15}{24}$, then b = ...

(20) The longest chord in a circle is called ....

(21) If $X = \{1, 2, 5, 7\}$ and $Y = \{1, 5, 3\}$, then $X \cap Y =$ ....

(22) The probability of the certain event = ...



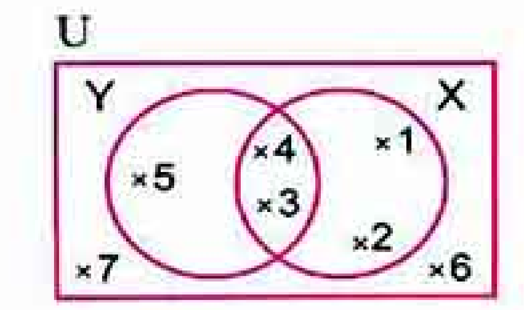


3 Answer the following :

(23) If the price of one metre of cloth is 6.45 pounds, then what is the price of 2.4 metres of cloth ?

The price = ...

(24) By using the opposite Venn diagram, find the following sets by listing method :



[a] $X \cap Y$ = ...

[b] $Y^{`}$ = ...

(25) Draw the triangle XYZ in which
XY = YZ = 7 cm. and XZ = 4 cm.

(26) A bag contains 5 white balls, 9 red balls and 6 black balls identically, a ball is drawn blindly, then what is the probability that the drawn ball is white ?

....





Model Examinations 2018

Model 1

Answer the following questions :

1 ***Choose the correct answer :***

(1) 14.726 ≃ .... (to the nearest hundredth)

(14.7 *or* 14.73 *or* 14.72 *or* 15)

(2) {3} .... {1 , 3 , 5} ($\in$ *or* $\notin$ *or* $\subset$ *or* $\not\subset$)

(3) 9.64 ÷ 4 = ... (241 *or* 2.41 *or* 1.96 *or* 38.56)

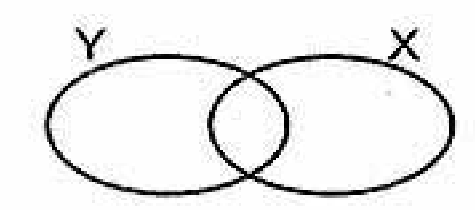
(4) The probability of the impossible event is ....

(0 *or* $\frac{1}{3}$ *or* $\frac{2}{3}$ *or* 1)

(5) $\frac{1}{2} \div \frac{1}{4}$ = ... (2 *or* 4 *or* 3 *or* 6)

(6) If $X \subset Y$, then $X \cap Y$ = ... (X *or* Y *or* U *or* $\acute{X}$)

(7) The shaded part in the opposite figure represents ....



($X \cup Y$ *or* $X - Y$ *or* U *or* $X \cap Y$)

(8) A circle with a diameter length 8 cm. , then the length of its radius = ... cm. (4 *or* 5 *or* 6 *or* 16)

(9) 2.5 × 100 = ... (250 *or* 25 *or* 0.25 *or* 0.025)

(10) 3 .... {33} ($\subset$ *or* $\not\subset$ *or* $\in$ *or* $\notin$)

(11) $3\frac{1}{8}$ ≃ .... (to the nearest hundredth)

(3.10 *or* 3.12 *or* 3.13 *or* 3)

(12) The number of the altitudes in any triangle = ...

(1 *or* 2 *or* 3 *or* 0)

(13) 3 .... the set of the odd numbers.

($\in$ *or* $\not\subset$ *or* $\notin$ *or* $\subset$)

(14) $\left(2\frac{1}{2} + 7\frac{1}{2}\right) \div \frac{1}{5}$ = ... (2 *or* 5 *or* 10 *or* 50)



2 ***Complete each of the following :***

(15) 3.75 × 1 000 = ...

(16) If $\{1 , x\} = \{2 , y\}$, then x = ... and y = ...

(17) All radii of the same circle are ....

(18) $3\frac{1}{2} \div \frac{7}{12} =$ ....

(19) The longest chord in a circle is the ....

(20) 20.6354 × 100 = ... ≃ .... (to the nearest tenth)

---

3 ***Answer the following :***

(21) $\frac{1}{4} \times \frac{2}{3} =$ ....

(22) 43.85 – 12.28 = ...

(23) 6.8 × 3.2 = ...

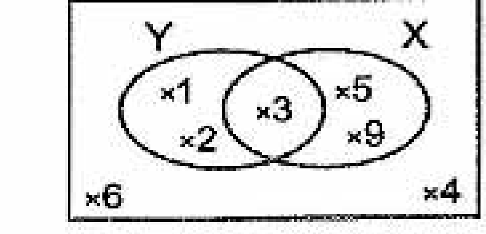
(24) 1575 ÷ 63 = ...

(25) The length of a roll of cloth is 53.55 metres. It was divided into equal parts where the length of each part is 3.15 metres.
Find the number of these parts.

....

(26) Find all the subsets of the set X where X = {a , b}

(27) By using the opposite Venn diagram , find :



[a] X ∪ Y

[b] X ∩ Y

[c] X – Y

[d] Ỳ

(28) Arrange the following numbers in an ascending order :

$\frac{1}{4}$, 0.8 , 0.4 and $\frac{1}{2}$

....

(29) Draw the isosceles triangle ABC
in which BC = 4 cm. and AB = AC = 6 cm.
, then draw $\overline{AD}$ perpendicular to $\overleftrightarrow{BC}$

(30) A bag contains 5 red balls , 8 black balls and 7 white balls and all the balls are equal in size , if a ball is drawn randomly.
What is the probability that :

[a] The drawn ball is white ?

[b] The drawn ball is black ?

[c] The drawn ball is not red ?

[d] The drawn ball is white or black ?



Model 2

Answer the following questions :

1 *Choose the correct answer :*

(1) 12 ………… $\{0, 2, 4, 6, 8, \dots\}$ $(\in$ or $\notin$ or $\subset$ or $\not\subset)$

(2) 50 days ≃ ………… weeks (to the nearest week)
(7 or 6 or 5 or 4)

(3) 327 ÷ 24 = 3.27 ÷ ………… (24 or 2.4 or 0.24 or 240)

(4) The longest chord in the circle is called …………
(diameter or radius or side or centre)

(5) The set $\{2, 4, 6, \dots\}$ is ………… set.
(a finite or an infinite or an empty)

(6) The altitudes of the obtuse-angled triangle intersect at one point ………… the triangle.
(inside or outside or at the vertex of the right angle)

(7) 48.2 × 3.7 ………… 4.82 × 37 $(\neq$ or $<$ or $>$ or $=)$

(8) A circle of radius length 5 cm. , then its diameter length = ………… cm.
(2.5 or 10 or 15 or 5)

(9) If $3 \notin \{x, x-1, x+1\}$, then x = …………
(2 or 3 or 4 or 1)

(10) If $X \subset Y$, then $X \cup Y$ = ………… (X or Y or U or $\varnothing$)

(11) If $\{2, 5\} - \{4, x, 5\} = \varnothing$, then x = …………
(2 or 4 or 5 or 6)

(12) 5.67 ÷ 2.4 = ………… ÷ 24
(0.567 or 5.67 or 56.7 or 567)

(13) $\{7, 8\}$ ………… $\{7, 9, 11\}$ $(\in$ or $\not\subset$ or $\notin$ or $\subset)$

(14) The decimal form of the fraction $\frac{3}{20}$ is …………
(0.15 or $\frac{1}{7}$ or 0.3 or $\frac{15}{21}$)

2 *Complete the following :*

(15) 20.857 ≃ ………… (to the nearest $\frac{1}{100}$)

(16) 63 days = ………… weeks.



(17) If $7 \in \{2, x, 5\}$, then $x =$ ....

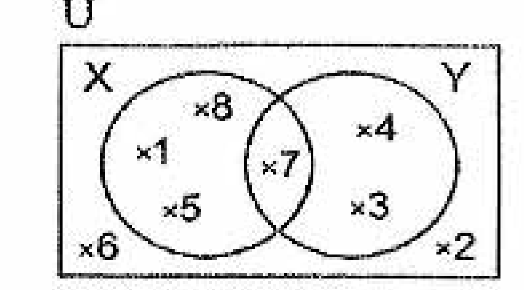
(18) The longest chord in the circle is ....

(19) $45.67 \div 100 =$ .... $\simeq$ .... (to the nearest $\frac{1}{100}$)

(20) The probability of the sure event = ...

3 *Answer the following :*

(21) Using the opposite Venn diagram, find by listing method :



[a] $X \cap Y$ [b] $X \cup Y$

[c] $Y - X$ [d] $(X \cap Y)^{`}$

(22) Arrange the following numbers in an ascending order :

$7\frac{3}{5}$, 5.56, $7\frac{3}{4}$ and 6.2

....

(23) In the experiment of throwing a die once, find the probability of appearing :

[a] An odd number smaller than 5 [b] An even prime number

[c] A number divisible by 3 [d] A number bigger than 6

(24) $17.5 \times 8.43 =$ .... $\simeq$ .... (to the nearest tenth)

(25) $420.353 - 67.51 =$ .... $\simeq$ .... (to the nearest hundredth)

(26) $\frac{1}{2} \div \frac{4}{5} =$ ....

(27) $6\,188 \div 221 =$ ....

(28) Draw a circle M of diameter length 6 cm. , then draw the diameter $\overline{BC}$ and the chord $\overline{BA}$ of length 3 cm.

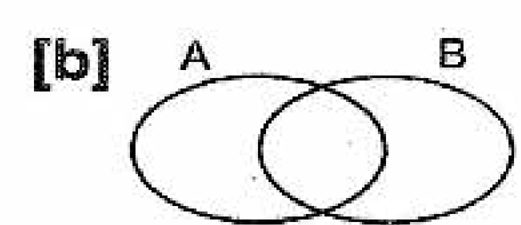
(29) A barrel has 236.25 litres of oil. If we want to pack it in bottles where every bottle holds 0.75 litres. Find the number of bottles.

....

(30) Write the relation between the two sets A and B which represent the shaded part of each shape :

[a]


....

[b]


....



Model 3

Answer the following questions :

1 ***Choose the correct answer :***

(1) The probability of the impossible event = ...

($\varnothing$ *or* zero *or* 0.5 *or* 1)

(2) The number of the altitudes of the triangle = ...

(0 *or* 1 *or* 2 *or* 3)

(3) 46.432 ≃ 46.43 approximated to the nearest ....

(ten *or* 0.1 *or* 0.01 *or* 0.001)

(4) If $\{x , 2\} = \{2 , 5\}$, then x = ...

(1 *or* 2 *or* 3 *or* 5)

(5) $\{1 , 2 , 3 , 4 , \cdots\}$ is .... set.

(a finite *or* an infinite *or* an empty)

(6) A circle is of diameter length 8 cm. , then its radius length = ... cm.

(6 *or* 8 *or* 16 *or* 4)

(7) $\frac{4}{3} \times$ .... = 1 ($\frac{5}{4}$ *or* $\frac{1}{4}$ *or* 0.75 *or* 0.8)

(8) $\{4 , 3\} \cap \varnothing$ = ... ($\{4\}$ *or* $\{3\}$ *or* $\{4 , 3\}$ *or* $\varnothing$)

(9) 0.3 × 0.2 = ... (0.6 *or* 0.06 *or* 0.006 *or* 6)

(10) When tossing a die once , the probability of getting a prime number = ... ($\frac{5}{6}$ *or* $\frac{1}{3}$ *or* $\frac{1}{6}$ *or* $\frac{1}{2}$)

(11) 255 ÷ 25 = 2.55 ÷ .... (2.5 *or* 0.25 *or* 25 *or* 2500)

(12) 8 .... $\{18 , 808\}$ ($\in$ *or* $\notin$ *or* $\subset$ *or* $\not\subset$)

(13) The longest chord in the circle is called ....

(radius *or* side *or* diameter *or* centre)

(14) 245 hours ≃ .... days. (11 *or* 10 *or* 12 *or* 9)

2 *Complete the following :*

(15) $\frac{1}{4} \times 4 =$ ....

(16) All diameters are .... in length in the same circle.

(17) 354 cm. = ... m.

(18) If $6 \in \{2x , 3 , 5\}$, then $x =$ ....

(19) The probability of the certain event = ...

(20) 8.3 tons = ... kg.

3 *Answer the following :*

(21) $4.52 \times 0.3 =$ .... $\simeq$ .... (to the nearest 2 decimal place)

(22) $24.7 - 7\frac{1}{2} =$ .... $\simeq$ .... (to the nearest unit)

(23) $2.46 \div 0.6 =$ ....

(24) Arrange in an ascending order :

7.8 , 7.75 , $6\frac{1}{4}$ and 6.4

....

(25) If $U = \{1 , 2 , 3 , 4 , 5 , 6 , 7 , 8\}$
, $X = \{2 , 4 , 5 , 6\}$ and $Y = \{4 , 5 , 7\}$
Represent these sets by Venn diagram
, then find :

[a] $X \cap Y$ [b] $X \cup Y$

[c] $X - Y$ [d] $X`$

(26) As throwing a fair die once , calculate the probability of :

[a] Appearing a number greater than 3 and less than 4

[b] Appearing an even prime number.

[c] Appearing an odd number.

(27) Find the area of the rectangle of 15.5 metres long and 7.5 metres wide.

....

(28) Draw the circle whose its diameter $\overline{BC}$
such that BC = 8 cm. and draw the chord $\overline{BA}$
its length = 4 cm. and draw $\overline{AC}$
, use the protractor to measure ∠ BAC



(29) If the price of a piece of sweet is 2.25 pounds. What is the price of 25 pieces of the same kind ?

....

(30) If $\frac{2}{3} = \frac{16}{c}$, find the value of c

....

Model 4

Answer the following questions :

1 ***Choose the correct answer :***

(1) $\frac{7}{9}$ .... $2\frac{1}{9}$ (< *or* > *or* = *or* ≥)

(2) If a ∈ X , then a .... $\acute{X}$ (∈ *or* ∉ *or* ⊂ *or* ⊄)

(3) 736.592 ≃ 736.59 to the nearest ....

(0.1 *or* 0.01 *or* 0.001 *or* 100)

(4) The probability of the sure event = ...

(0 *or* 1 *or* 2 *or* 3)

(5) 75.3 ÷ 100 = ... (753 *or* 7.53 *or* 7530 *or* 0.753)

(6) The number of altitudes of any triangle is ....

(1 *or* 2 *or* 3 *or* 4)

(7) 1575 ÷ 63 = ... (45 *or* 35 *or* 25 *or* 15)

(8) 58.236 × 100 .... 582.36 (< *or* > *or* = *or* ≤)

(9) The measure of the right angle = ...

(80° *or* 90° *or* 180° *or* 140°)

(10) {17} .... {1 , 7 , 17 , 27} (∉ *or* ∈ *or* ⊂ *or* ⊄)

(11) The altitudes of the obtuse-angled triangle intersect at one point located .... the triangle. (on *or* inside *or* outside)

(12) If {1 , 5 , 4} = {1 , 4 , x + 2} , then x = ...

(7 *or* 3 *or* 4 *or* 5)

(13) 325.4 ÷ 10 .... 3 254 ÷ 100 (< *or* = *or* ≠ *or* >)

(14) If $\frac{3}{5} = \frac{x}{20}$, then x = ... (7 *or* 12 *or* 15 *or* 18)

2 ***Complete the following :***

(15) 3.4 kg. = ... gm.

(16) If $4 \in \{3 , x , 5\}$, then x = ...

(17) The longest chord in a circle is called ....

(18) If $\{3 , 6\} = \{y , 3\}$, then y = ...

(19) .... $\times 2 \frac{1}{5} = 1$

(20) $546.8 \div 53 \simeq$ .... (to the nearest tenth)

3 ***Answer the following :***

(21) $42.785 + 37\frac{1}{2}$ = ...

(22) $46 - 23.456$ = ... $\simeq$ .... (to the nearest hundredth)

(23) $2.46 \div 0.6$ = ...

(24) Draw a circle M with radius length 5 cm.
, draw $\overline{AB}$ is a diameter and $\overline{BC}$ is a chord
with length 8 cm. , draw $\overline{AC}$, then find :

[a] The length of $\overline{AC}$ **[b]** m ($\angle$ C)

(25) A box contains 20 cards numbered from 1 to 20 , if a card is drawn randomly , calculate the probability of the drawn card is :

[a] An odd number **[b]** A number divisible by 3

[c] A number less than 6

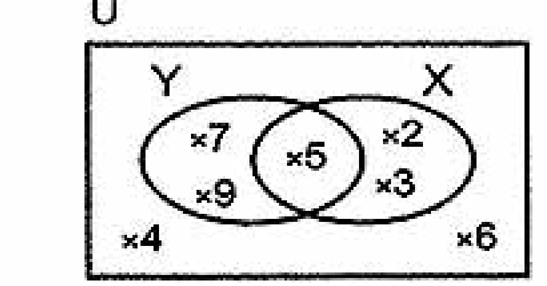
(26) From the opposite Venn diagram , find by the listing method :

[a] $X \cup Y$

[b] $X \cap Y$

[c] $X - Y$

[d] $X`$



(27) Arrange the following numbers ascendingly :

$14\frac{1}{4}$, 15.025 , 14.375 and $14\frac{1}{8}$

....

(28) Draw the equilateral triangle ABC
whose side length = 5 cm. , then
draw $\overline{AD} \perp \overline{BC}$ and find :

[a] The perimeter of $\triangle$ ABC

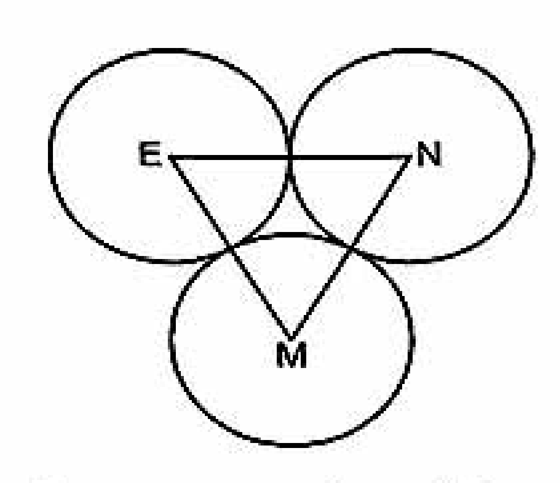
[b] m ($\angle$ CAD) by measuring.



(29) ***In the opposite figure :***

Three circles of centres M , N and E of radius length 3 cm. for each.

Find the perimeter of $\triangle$ MEN



(30) If the length of a piece of cloth is 9.25 m. , 12 towels are made of it , the length of each towel is 0.75 m.

How many metres are remainder ?

....

Model 5

Answer the following questions :

1 ***Choose the correct answer :***

(1) $A \cup \grave{A}$ = ... ($\varnothing$ *or* A *or* $\grave{A}$ *or* U)

(2) 2.7 × 3.5 .... 0.27 × 35 (≠ *or* > *or* = *or* <)

(3) 572.4 cm. to the nearest metre = ...

(6 *or* 50 *or* 6.8 *or* 572)

(4) The probability of impossible event is ....

(1 *or* 7 *or* 0 *or* $\varnothing$)

(5) The number of altitudes of the triangle = ...

(0 *or* 2 *or* 1 *or* 3)

(6) If $3 \in \{x + 2 , 5\}$, then x = ... (1 *or* 2 *or* 3 *or* 4)

(7) {2 , 4} .... {2 , 3 , 4} ($\in$ *or* $\notin$ *or* $\subset$ *or* $\not\subset$)

(8) If the radius length of a circle is 5 cm. , then the length of the longest chord is .... cm. (5 *or* 10 *or* 2.5 *or* 7)

(9) The set of odd numbers is .... set.

(a finite *or* an infinite *or* an empty)

(10) $\frac{1}{2}$ .... $\frac{3}{4}$ (< *or* > *or* = *or* ≥)

(11) 10 halves .... 20 fifths (> *or* < *or* ≤ *or* =)

(12) $7465.3 \div 100 =$ ....

(74653 *or* 746.53 *or* 74.653 *or* 7.4653)

(13) If $\{3, 4\} = \{1 + y, 4\}$, then $y =$ ....

(7 *or* 4 *or* 2 *or* 5)

(14) The longest chord in a circle is the ....

(diameter *or* center *or* radius *or* side)

2 *Complete the following :*

(15) $\{3, 4, 5\} \cup \{1, 4, 5\} =$ ....

(16) $36.274 + 33.28 =$ .... $\simeq$ .... (to the nearest $\frac{1}{100}$)

(17) ABC is an equilateral triangle of side length 4.1 cm.

, then its perimeter = ... cm.

(18) $2\frac{3}{4} \div 1\frac{3}{8} =$ ....

(19) If $\{8, 6, 7\} = \{x, 8, 7\}$, then $x =$ ....

(20) $7.64 \times 0.93 \simeq$ .... (to the nearest thousandth)

3 *Answer the following :*

(21) $420.353 - 67.51 =$ .... $\simeq$ .... (to the nearest hundredth)

(22) $2\frac{4}{5} \div \frac{7}{10} =$ ....

(23) $3\,744 \div 234 =$ ....

(24) $\frac{2}{3} \times 15 =$ ....

(25) Arrange in an ascending order :

$14\frac{1}{4}$, 15.225, 14.375, 15.025 and $14\frac{1}{8}$

....

(26) Draw the triangle ABC where AB = 4 cm.

, BC = 5 cm. and CA = 6 cm.

, then draw its altitudes.



(27) Write all the subsets of the set X where X = {a , b , c} , what is the number of subsets ?

....

(28) A car covers equal distances in equal time. If this car covered 24.72 km. in one hour , how many km. are covered in $2\frac{1}{2}$ hours ?

....

(29) A box contains 22 cards numbered from 1 to 22 , if a card is drawn randomly , calculate the probability that the drawn card carries :

[a] An odd number. **[b]** An even prime number.

[c] A number divisible by 7 **[d]** A number less than 6

(30) If U = {1 , 2 , 3 , 4 , 5 , 6 , 9 , 10} , X = {1 , 2 , 3 , 4 , 6} , Y = {1 , 3 , 6 , 9}

Represent U , X and Y by Venn diagram , then find :

[a] $X \cap Y$ **[b]** $X \cup Y$

[c] $X - Y$

Model 6

Answer the following questions :

1 *Choose the correct answer :*

(1) $2\frac{1}{3}$ .... $\frac{9}{4}$ (> or < or ≤ or =)

(2) {4 , 5} .... {2 , 3 , 7} (∈ or ∉ or ⊂ or ⊄)

(3) The number of altitudes of the triangle is ....
(zero or 1 or 2 or 3)

(4) The probability of the impossible event = ...
(∅ or zero or 0.50 or 1)

(5) The number of subsets of the set {4 , 5} equals ....
(2 or 3 or 4 or 5)

(6) If 4 ∈ {2 , x , 5} , then x = ... (2 or 4 or 5 or 6)

(7) The decimal form of the fraction $\frac{3}{20}$ is ....
(0.15 or $\frac{15}{21}$ or $\frac{1}{7}$ or 0.3)

(8) 1.25 × 3.2 .... 32 × 12.5 (> or = or < or ≥)

(9) The quotient of dividing $2.25 \div 1.5 =$ ....

(1.5 *or* 15 *or* 0.15 *or* 500)

(10) $12.5 + 7.632 \simeq$ .... (to the nearest $\frac{1}{100}$)

(20.132 *or* 20.133 *or* 20.13 *or* 2.013)

(11) $225 \div$ .... $= 22.5$ (10 *or* 100 *or* 1000 *or* 100000)

(12) 3 .... the set of odd numbers. ($\in$ *or* $\notin$ *or* $\subset$ *or* $\not\subset$)

(13) 7 .... the set of the days of the week.

($\in$ *or* $\notin$ *or* $\subset$ *or* $\not\subset$)

(14) $\{5\} - \{1, 2, 5\} =$ ....

($\{5\}$ *or* $\{1, 2\}$ *or* $\{1, 2, 5\}$ *or* $\varnothing$)

2 *Complete the following :*

(15) ABC is an equilateral triangle of side length 5 cm. ,
then its perimeter = ... cm.

(16) If $X \subset Y$, then $X \cap Y =$ ....

(17) $327 \div 24 = 3.27 \div$ ....

(18) $\{3, 4, 5\} - \{1, 2, 5\} =$ ....

(19) $(278.25 - 8) \times 4.75 \simeq$ .... (to the nearest thousandth)

(20) $17.5 \times 8.43 =$ .... $\simeq$ .... (to the nearest tenth)

3 *Answer the following :*

(21) The side length of a square is 2.03 cm.
Find its area approximating to the nearest hundredth.

....

(22) Arrange the following numbers ascendingly :

$\frac{3}{5}$, $\frac{3}{8}$, 0.8 and 0.75

....

(23) Draw a circle whose centre is M
and its diameter $\overline{AB}$ of length 10 cm.
, then draw chord $\overline{BC}$ with of length 8 cm. (Don't remove the arcs)

Find : **[a]** The length of $\overline{AC}$ **[b]** m ($\angle$ C)



(24) A box contains 10 cards numbered from 1 to 10 , a card has been selected randomly. Calculate the probability of selecting :

[a] An even number. **[b]** A number divisible by 3

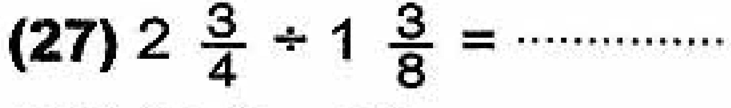
(25) Write all the subsets of X = {1 , 2}

(26) Using the opposite Venn diagram , find :

U: Y = {3, 4, 2}, X = {2, 1, 5}, outside: 8

[a] $X \cup Y$ **[b]** $X \cap Y$

[c] $\grave{X}$ **[d]** $X - Y$



(27) $2\frac{3}{4} \div 1\frac{3}{8} =$ ....

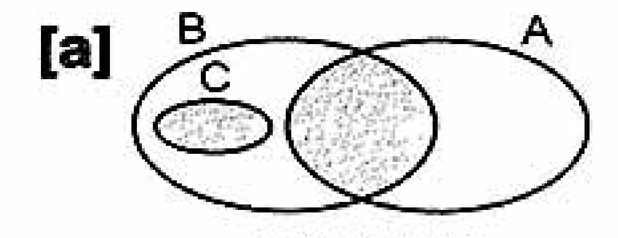
(28) $45.3 \times 5.2 =$ ....

(29) If L.E. 487.5 distributed among some people and each of them takes L.E. 1.5 , find the number of persons.

....

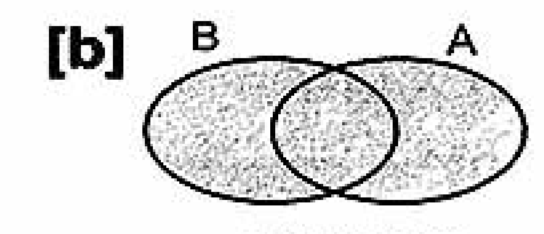
(30) Write what is represented by the shaded part in each diagram :

[a]



....

[b]



....

Model 7

Answer the following questions :

1 ***Choose the correct answer :***

(1) 255 ÷ 25 = 2.55 ÷ .... (2.5 *or* 0.25 *or* 25 *or* 2500)

(2) The longest chord in the circle is called ....
(a radius *or* a chord *or* a diameter *or* a diagonal)

(3) 55.241 × 100 .... 552.41 × 10 ($\neq$ *or* > *or* < *or* =)

(4) 7 .... {17 , 77} ($\in$ *or* $\notin$ *or* $\subset$ *or* $\not\subset$)

(5) 254 hours ≃ .... days. (11 *or* 10 *or* 12 *or* 9)

(6) If $X \cap Y = X$, then X .... Y ($\in$ *or* $\notin$ *or* $\subset$ *or* $\not\subset$)

(7) The number of altitudes of any triangle is ....
(2 *or* 3 *or* 4 *or* 5)

(8) ∅ .... {3 , 4} ($\in$ *or* $\notin$ *or* $\subset$ *or* $\not\subset$)

(9) The probability of the impossible event is ....

(0 *or* 1 *or* 0.5 *or* 0.3)

(10) $\{43\} \cap \{4, 3\}$ .... ($\{3\}$ *or* $\{4\}$ *or* $\{43\}$ *or* $\varnothing$)

(11) If the length of the radius of a circle is 5 cm. , then the length of the longest chord = ... cm. (2 *or* 8 *or* 6 *or* 10)

(12) $5.3553 \times 1000 \simeq$ .... (to the nearest whole number)

(535.6 *or* 535.5 *or* 5355 *or* 53.55)

(13) $12 \div \frac{4}{3} =$ .... (9 *or* 16 *or* 6 *or* 8)

(14) $806.7 \div 100 =$ .... (80.67 *or* 8.067 *or* 8.076 *or* 8.607)

2 ***Complete the following :***

(15) $6\frac{1}{4} \div 12\frac{1}{2} =$ ....

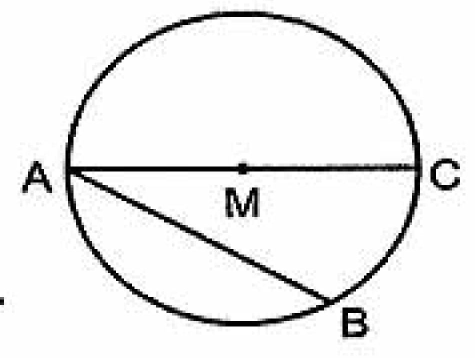
(16) $26.274 + 23.28 =$ .... $\simeq$ .... (to the nearest $\frac{1}{100}$)

(17) 39 days $\simeq$ .... weeks (to the nearest week)

(18) $(3.7 \times 0.4) + 2.4 =$ ....

(19) $\{2, 4, 7\} \cup \{1, 4, 7\} =$ ....

(20) **From the opposite circle :**



[a] The chord of the circle M is ....

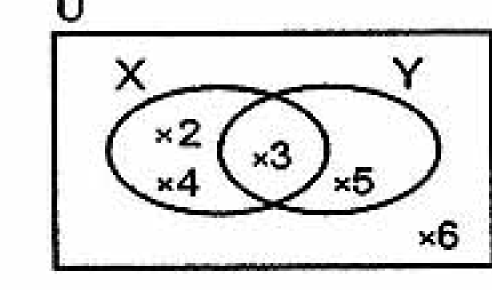
[b] The two radii of the circle M are .... and ....

3 ***Answer the following :***

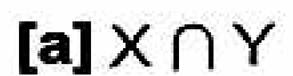
(21) A circle of diameter length 8 cm. , then find its radius length.

....

(22) By using the opposite Venn diagram , find :



[a] $X \cap Y$ [b] $X \cup Y$



[c] $X - Y$ [d] Y'

(23) Arrange in a descending order :

$3\frac{1}{2}$, 5 , $4\frac{1}{3}$, 3.2 and $4\frac{2}{7}$

....

(24) Draw the triangle ABC in which
AB = 6 cm. and BC = AC = 5 cm. , then draw $\overline{CD} \perp \overline{AB}$ and find the length of $\overline{CD}$

(25) If the price of one metre of cloth is 27.5 pounds , what is the price of 3 metres ?

....

(26) A box contains 5 white balls , 4 blue balls and 2 red balls , one ball is chosen randomly , find the probability of getting :

[a] A blue ball. **[b]** A red ball.

(27) 77.728 ÷ 6.94 = ...

(28) 11.5749 ≃ .... (to the nearest $\frac{1}{1000}$)

(29) 5.73 × 2.6 = ...

(30) 11183 ÷ 211 = ...

Model 8

Answer the following questions :

1 ***Choose the correct answer :***

(1) 63.578 ≃ 63.58 to the nearest ....
($\frac{1}{10}$ or $\frac{1}{100}$ or $\frac{1}{1000}$ or $\frac{1}{10000}$)

(2) $3\frac{1}{2} \div \frac{7}{12}$ = ... (6 or $\frac{3}{18}$ or $\frac{50}{12}$ or 4)

(3) 67.5 – 55.67 = ... (117.4 or 17.14 or 11.83 or 118.3)

(4) 3 .... {13.303} ($\in$ or $\notin$ or $\subset$ or $\not\subset$)

(5) The chord which passes through the centre of the circle is called ....
(a diameter or a radius or a diagonal or a side)

(6) The altitudes of .... -angled triangle intersect outside the triangle.
(right or acute or obtuse)

(7) {1 , 2} ∪ {2 , 3} = ...
({2} or {1 , 3} or {1 , 2 , 3} or ∅)



(8) $355 \div 18 = 3.55 \div$ .... (1.8 or 18 or 0.18 or 1800)

(9) If $\{7, 10\} = \{10, x + 4\}$, then $x =$ .... (3 or 4 or 5 or 7)

(10) If $X \subset Y$, then $X \cap Y =$ .... (X or Y or $\varnothing$ or U)

(11) The number of altitudes of the triangle is .... (0 or 1 or 2 or 3)

(12) $\{4, 5\}$ .... $\{2, 3, 7\}$ ($\in$ or $\notin$ or $\subset$ or $\not\subset$)

(13) 55.241×100 .... 552.41×10 ($\neq$ or $>$ or $<$ or $=$)

(14) $\{7\}$ .... $\{17, 77\}$ ($\in$ or $\notin$ or $\subset$ or $\not\subset$)

2 *Complete the following :*

(15) $\{2, 4, 6\} \cap$ the set of all factors of the number 2 equals ....

(16) $2\frac{3}{4} \div 1\frac{3}{8} =$ ....

(17) To draw a circle of diameter length 12 cm., then the opening distance of the compasses should be .... cm.

(18) $251.76 - 38\frac{1}{8} =$ .... (to the nearest 0.01)

(19) As throwing a metallic coin once then the sample space = ... and the number of elements of the sample space = ...

(20) $45.37 + 28.3 =$ .... $\simeq$ .... (to the nearest $\frac{1}{10}$)

3 *Answer the following :*

(21) The price of a bar of chocolate is L.E. 2.75
What is the cost of 15 bars of the same kind ?

(22) If $U = \{1, 2, 3, 4, 5, 6, 7\}$
, $X = \{1, 2, 3, 4\}$, $Y = \{1, 2, 5, 6\}$
Represent these sets by Venn diagram, then find :
[a] $X \cup Y$ [b] $X - Y$ [c] $\acute{X}$

(23) Draw the triangle ABC in which
AB = 4 cm., BC = 5 cm. and AC = 6 cm.

(24) A bag contains 5 white balls, 7 black balls and 3 red balls.
All balls are equally likely in size, a ball is selected randomly, find the probability of getting :
[a] A black ball. [b] A yellow ball.
[c] A red ball. [d] A white or red ball.



(25) $38.5 \times 2.3 =$ ....

(26) $6.25 \div 2.5 =$ ....

(27) $10277 \div 239 =$ ....

(28) $\frac{3}{7} \times 1\frac{5}{9} =$ ....

(29) Arrange ascendingly : $14\frac{1}{4}$, 15.025 , 14.375 and $14\frac{1}{8}$

....

(30) Find the perimeter of the rectangle whose length is 4.1 cm. and its width is 3.5 cm. , then calculate its perimeter.

....

....

Model 9

Answer the following questions :

1 ***Choose the correct answer :***

(1) $4.25 \times 1000 =$ .... (425 or 42.5 or 42500 or 4250)

(2) The probability of the certain event is .... (zero or 1 or 0.5 or $\varnothing$)

(3) The number of altitudes of any triangle is .... (zero or 1 or 2 or 3)

(4) If $\{3 , 6\} = \{3 , x - 3\}$, then $x =$ .... (2 or 3 or 6 or 9)

(5) ABC is an equilateral triangle of side length 4.5 cm. , then its perimeter = ... cm. (12 or 13.5 or 15 or 9)

(6) The quotient of dividing $2.25 \div 1.5 =$ .... (1.5 or 15 or 0.15 or 500)

(7) The probability that the elephant flies = ... (1 or zero or $\varnothing$ or $\frac{1}{2}$)

(8) 32 .... $\{3 , 2 , 5\}$ ($\in$ or $\notin$ or $\subset$ or $\not\subset$)

(9) The longest chord in the circle is called .... (radius or side or centre or diameter)

(10) $\varnothing$ .... $\{0 , 7\}$ ($\in$ or $\notin$ or $\subset$ or $\not\subset$)

(11) If $X \subset Y$, then $X \cap Y =$ .... (X or Y or U or $\varnothing$)



(12) A circle with diameter length = 8 cm.
, then its radius length = ... cm. (8 *or* 16 *or* 6 *or* 4)

(13) 39 days ≃ .... weeks (to the nearest week)
(5 *or* 6 *or* 7 *or* 8)

(14) $86.4 \div 100 =$ .... (864 *or* 8.64 *or* 8640 *or* 0.864)

2 *Complete each of the following :*

(15) 37.2664 ≃ .... (to the nearest thousandth)

(16) $\{45\} - \{5\} =$ ....

(17) $\frac{2}{7} \div \frac{3}{7} =$ ....

(18) As throwing a fair die once , then the probability of appearing an even number = ...

(19) 657 kilometres = ... metres

(20) $4.25 \div$ .... $= 8\frac{1}{2}$

3 *Answer the following :*

(21) $4\frac{19}{500} \simeq$ .... (to the nearest hundredth)

(22) $\frac{3}{4} \times \frac{4}{9} =$ .... (in the simplest form)

(23) $3.125 \times 4.3 =$ .... ≃ .... (to the nearest thousandth)

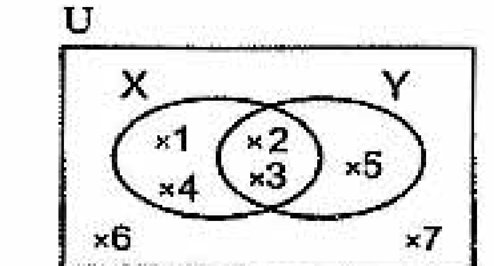
(24) $26.274 + 23.28 =$ .... ≃ .... (to the nearest whole number)

(25) If $X = \{2, 4, 5, 9\}$ and $Y = \{4, 8, 9\}$
Represent the two sets X and Y using a Venn diagram , then find : $X \cap Y$

(26) If A = 13.225 and B = 12.45 , find the result of A + B to the nearest tenth.

....

(27) Look at the opposite Venn diagram and find :



[a] $X \cup Y$ **[b]** $X - Y$
[c] $X \cap Y$ **[d]** $(X \cup Y)'$

(28) If the price of one piece of sweet is 4.25 pounds , what is the cost price of 36 pieces of the same kind ?

....



(29) Draw the equilateral triangle ABC whose side length = 5 cm. and draw $\overline{AD} \perp \overline{BC}$, then find the perimeter of Δ ABC

(30) As throwing a fair die once , what is the probability of getting :

[a] A number less than or equal to 6 **[b]** A number more than 6

[c] A number divisible by 3 **[d]** A prime number.

Model 10

Answer the following questions :

1 *Choose the correct answer :*

(1) $98.7 \times 1000 =$ .... (987.0 *or* 0.987 *or* 98700 *or* 9870)

(2) $\varnothing$ .... $\{0\}$ ($\in$ *or* $\notin$ *or* $\subset$ *or* $\not\subset$)

(3) The length of the diameter = ... ($\frac{1}{2}$ r *or* r *or* 2 r *or* 3 r)

(4) Every triangle has .... altitudes. (1 *or* 2 *or* 3 *or* 4)

(5) 12 .... $\{0 , 2 , 4 , 6 , \cdots\}$ ($\subset$ *or* $\not\subset$ *or* $\in$ *or* $\notin$)

(6) If M is a circle whose diameter length is 8 cm. where MA = 7 cm. , then the point A is located .... the circle. (inside *or* outside *or* on)

(7) $355 \div 18 = 3.55 \div$ .... (1800 *or* 18 *or* 108 *or* 0.18)

(8) If $X \subset Y$, then $X - Y =$ .... (X *or* Y *or* $\varnothing$ *or* U)

(9) $86.4 \div 100 =$ .... (86.4 *or* 0.864 *or* 8.64 *or* 8640)

(10) $\frac{1}{2} \times \frac{1}{2} =$ .... (4 *or* 1 *or* $\frac{1}{4}$ *or* 2)

(11) If $\{3 , 4\} = \{y + 1 , 4\}$, then y = ... (3 *or* 4 *or* 2)

(12) The longest chord in the circle is called a .... (centre *or* diameter *or* radius *or* side)

(13) $A \cap \grave{A} =$ .... (U *or* A *or* $\varnothing$ *or* $\grave{A}$)

(14) $\{1 , 3\}$ .... $\{5 , 7 , 8\}$ ($\in$ *or* $\notin$ *or* $\subset$ *or* $\not\subset$)

2 ***Complete the following :***

(15) $478.347 - 134.834 =$ .... $\simeq$ .... (to the nearest hundredth)

(16) If $X \subset Y$, then $X \cup Y =$ ....

(17) $\{2 , 4 , 6\} \cap$ the set of all factors of the number 2 = ...

(18) $2\frac{1}{4} \div 1\frac{1}{8} =$ ....

(19) 40 days $\simeq$ .... weeks (to the nearest week)

(20) If $8 \in \{5 , 6 , x\}$, then $x =$ ....

---

3 ***Answer the following :***

(21) $6630 \div 195 =$ ....

(22) $2\frac{1}{2} \times 1\frac{1}{3} =$ ....

(23) $104.32 \div 3.26 =$ ....

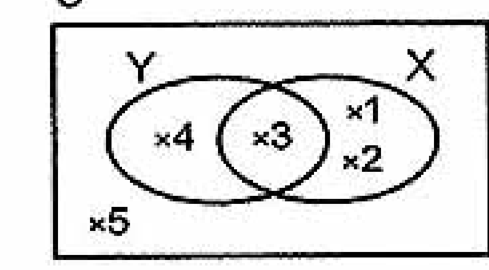
(24) $64.43 \div 10 =$ .... $\simeq$ .... (to the nearest hundredth)

(25) $7.2145 \times 100 =$ .... $\simeq$ .... (to the nearest tenth)

(26) Write all subsets of the set $X = \{5 , 7\}$

....

(27) From the opposite Venn diagram , find :



[a] $X \cap Y$ **[b]** $X \cup Y$

[c] $X - Y$ **[d]** $\acute{Y}$

(28) If the price of one can of juice is L.E. 3.25

Find the price of 7 cans of juice.

....

(29) Draw the equilateral triangle ABC whose side length is 5 cm. , then find m ($\angle$ ABC)

(30) A fair die is thrown once. What is the probability of each of the following event :

[a] Appearing an odd number.

[b] Appearing a number more than 4

Model 11

Answer the following questions :

1 ***Choose the correct answer :***

(1) 2 .... {5 , 2 , 52} ($\in$ *or* $\notin$ *or* $\subset$ *or* $\not\subset$)

(2) 55.241 × 100 .... 552.41 ($\leq$ *or* $>$ *or* $<$ *or* $=$)

(3) The length of the diameter of the circle whose radius length is 4 cm. = ... cm. (4 *or* 8 *or* 16 *or* 2)

(4) 806.7 ÷ 100 = ...

(80.67 *or* 8.067 *or* 8067 *or* 80670)

(5) The number 83.7694 ≃ 83.77 to the nearest ....

($\frac{1}{10}$ *or* $\frac{1}{100}$ *or* $\frac{1}{1000}$ *or* $\frac{1}{10000}$)

(6) If $X \subset Y$, then $X \cap Y$ = ... (X *or* Y *or* U *or* $\varnothing$)

(7) 327 ÷ 24 = 3.27 ÷ .... (2.4 *or* 0.24 *or* 24 *or* 240)

(8) {3} .... {303 , 13} ($\in$ *or* $\notin$ *or* $\subset$ *or* $\not\subset$)

(9) The number of altitudes of the right-angled triangle is ....

(1 *or* 2 *or* 3 *or* 0)

(10) The altitudes of the acute-angled triangle intersect .... the triangle. (inside *or* outside *or* on)

(11) $\frac{1}{8}$ ≃ .... (to the nearest hundredth)

(0.125 *or* 0.12 *or* 0.13 *or* 1.0)

(12) Probability of certain event is ....

($\varnothing$ *or* 1 *or* 0 *or* 2)

(13) Any line segment connects between any two points on the circle is called .... (centre *or* diameter *or* radius *or* chord)

(14) $1\frac{1}{2} \div \frac{1}{2}$ = ... (3 *or* $\frac{3}{4}$ *or* 12 *or* 6)

2 *Complete the following :*

(15) $\varnothing$ .... $\{a , b\}$

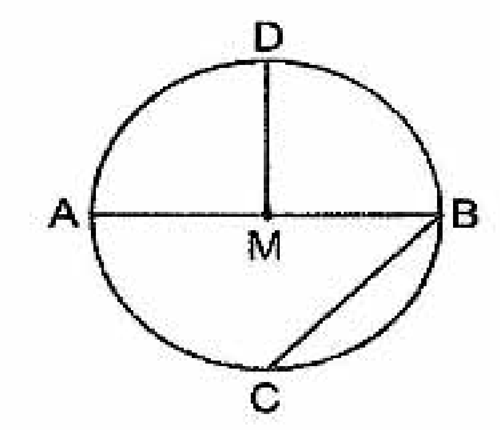
(16) $6.35 + 17.025 \simeq$ .... to the nearest $\frac{1}{100}$

(17) It is .... that the sun rises from the west.

(18) As throwing a fair die once , then the probability of appearing a number less than 3 is ....

(19) The altitudes of the right-angled triangle intersect at ....

(20) From the opposite figure :



[a] $\overline{BC}$ is called .... in the circle M

[b] .... is a diameter.

3 *Answer the following :*

(21) $3.52 \times 4.6 =$ ....

(22) $2\frac{1}{2} \times 1\frac{1}{5} =$ ....

(23) $5674.9 \div 1000 =$ ....

(24) $860.7 \div 1.9 =$ ....

(25) The price of a bar of chocolate is L.E. 2.75 , what is the cost of 15 bars of the same kind ?

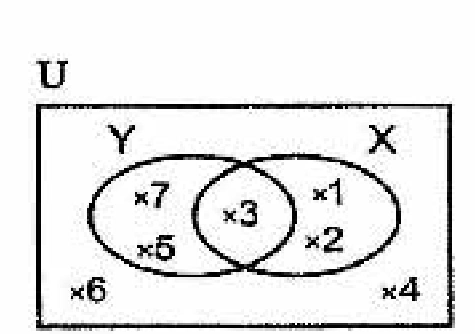
....

(26) Arrange the following numbers in an descending order :

$\frac{1}{4}$, 0.8 , 0.4 and $\frac{1}{2}$

....

(27) From the opposite Venn diagram , complete :



[a] $X \cap Y$

[b] $X \cup Y$

[c] $X - Y$

[d] X'

(28) Write all the subsets of the set X where $X = \{5 , 6 , 7\}$



....

(29) A bag contains 5 white balls , 7 black balls and 3 red balls. All balls are equal in size. A balls is drawn randomly , calculate the probability of the drawn ball is :

[a] Black. **[b]** Yellow.

[c] White or red. **[d]** Not red.

(30) Draw Δ ABC where AB = AC = 5 cm. and BC = 4 cm. , then draw $\overline{AD}$ perpendicular from A to $\overleftrightarrow{BC}$

Model 12

Answer the following questions :

1 *Choose the correct answer :*

(1) The probability of the impossible event = ... (0.5 *or* 1 *or* 0 *or* $\varnothing$)

(2) 2.7×3.5 .... 0.27×35 ($>$ *or* $<$ *or* $\neq$ *or* $=$)

(3) $\varnothing$ .... $\{8 , 7\}$ ($\in$ *or* $\notin$ *or* $\subset$ *or* $\not\subset$)

(4) If $\{3 , 6\} = \{3 , x\}$, then $x =$ .... (2 *or* 9 *or* 3 *or* 6)

(5) If $X \subset Y$, then $X \cap Y =$ .... (U *or* X *or* Y *or* $\varnothing$)

(6) $56.7 \div$ .... $= 0.0567$ (10 *or* 100 *or* 1000 *or* 10000)

(7) $\{5\}$ .... $\{55 , 15\}$ ($\in$ *or* $\notin$ *or* $\subset$ *or* $\not\subset$)

(8) The right-angled triangle has .... altitudes. (0 *or* 1 *or* 2 *or* 3)

(9) 38 days $\simeq$ .... week (to the nearest week) (4 *or* 5 *or* 6 *or* 7)

(10) 7 .... $\{3 , 5 , 7 , 8\}$ ($\in$ *or* $\notin$ *or* $\subset$ *or* $\not\subset$)

(11) $255 \div 2.5 =$ .... (10.5 *or* 102 *or* 12 *or* 120)

(12) 34596 gm. $\simeq$ .... kg. (35 *or* 346 *or* 3460 *or* 34)

(13) zero .... $\varnothing$ ($\in$ *or* $\notin$ *or* $\subset$ *or* $\not\subset$)

(14) $\{1 , 7\}$ .... $\{1 , 2 , 3 , 4 , ...\}$ ($\in$ *or* $\notin$ *or* $\subset$ *or* $\not\subset$)



2 *Complete the following :*

(15) The longest chord in the circle is called ....

(16) $\{1 , 3\} \subset \{1 + y , 4 , 1\}$, then : y = ...

(17) 572.3 cm. ≃ .... m. (to the nearest metre)

(18) If $A \subset B$, then : A – B = ...

(19) $6\frac{1}{4} \div 12\frac{1}{2}$ = ...

(20) 26.274 + 23.28 = ... ≃ .... $\left(\text{to the nearest } \frac{1}{100}\right)$

3 *Answer the following :*

(21) 77.728 ÷ 6.94 = ...

(22) 11183 ÷ 211 = ...

(23) $2\frac{1}{2} \times 3\frac{1}{4}$ = ...

(24) 3.5 × 2.7 = ...

(25) 56.748 – 29.6666 = ... ≃ .... $\left(\text{to the nearest } \frac{1}{1000}\right)$

(26) If the universal set U = the set of all factors of the number 12 and X = $\{1 , 3 , 2 , 6\}$ and Y = $\{1 , 4 , 6 , 3\}$

Draw a Venn diagram which represent the sets U , X and Y , then find :

[a] $X \cup Y$ **[b]** $X \cap Y$ **[c]** $\grave{X}$

(27) A die is rolled once and the number of points on the upper face is observed. Find the probability of appearing :

[a] A number greater than or equal to 3

[b] An odd prime number.

(28) Rearrange the following numbers ascendingly :

$\frac{3}{2}$, $\frac{3}{7}$, $\frac{3}{5}$, $\frac{3}{8}$ and $\frac{3}{4}$

....

(29) Draw the triangle ABC in which AB = 4 cm. , BC = 6 cm. and CA = 8 cm. , then draw a circle whose centre is B and its radius length is equal to 4 cm. , then complete the following :

[a] The point A is located .... the circle.

[b] The point C is located .... the circle.

[c] The .... is called the radius of the circle.



(30) Find the area of the square whose side length is 5.02 m. approximating the result to the nearest tenth.

....

Model 13

Answer the following questions :

1 ***Choose the correct answer :***

(1) $7465.3 \div 100 =$ ....
(74653 **or** 746.53 **or** 74.653 **or** 7.4653)

(2) $2.25 \div 1.5 =$ .... (105 **or** 1.5 **or** 15 **or** 0.15)

(3) $X - X =$ .... (zero **or** $\{0\}$ **or** $\{1\}$ **or** $\varnothing$)

(4) The altitudes of the triangle intersect at ....
(one point **or** two points **or** three points **or** four points)

(5) $3.75 \times 1000 =$ ....
(37.50 **or** 375 **or** 3750 **or** 375000)

(6) The probability of the impossible event = ...
(0 **or** 1 **or** 0.5 **or** $\varnothing$)

(7) If $\{4 , x + 2\} = \{7 , 4\}$, then $x =$ ....
(4 **or** 5 **or** 7 **or** 9)

(8) The longest chord in the circle is called ....
(radius **or** centre **or** side **or** diameter)

(9) $255 \div 25 = 2.55 \div$ ....
(25 **or** 0.25 **or** 2.5 **or** 2500)

(10) 5.4 tons = ... kg.
(5400 **or** 540 **or** 0.54 **or** 54000)

(11) 8 .... $\{7 , 5 , 8\}$ ($\in$ **or** $\notin$ **or** $\subset$ **or** $\not\subset$)

(12) $\varnothing$ .... $\{0 , 1 , 3\}$ ($\in$ **or** $\notin$ **or** $\subset$ **or** $\not\subset$)

(13) 12 .... The set days of the week. ($\subset$ **or** $\in$ **or** $\not\subset$ **or** $\notin$)

(14) 10 halves .... 20 fifths. ($\leq$ **or** $>$ **or** $<$ **or** $=$)



2 ***Complete the following :***

(15) The diameter of a circle is a chord that crosses the ....

(16) $\{1, 2\} \cup \{2, 3\} =$ ....

(17) $\{5, 7\} - \{1, 2\} =$ ....

(18) 4 tens ÷ 8 tenths = ...

(19) If $X \cap Y = \varnothing$, then X and Y are ....

(20) The probability of the sure event = ...

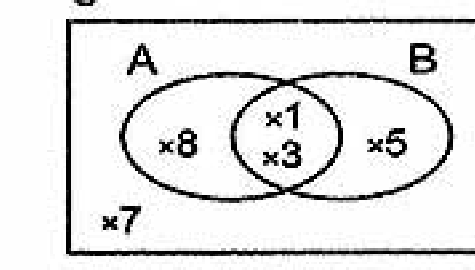
3 ***Answer the following :***

(21) $3\frac{1}{5} \times 15 =$ .... **(22)** $5.766 \simeq$ .... (to the nearest $\frac{1}{100}$)

(23) $7.4 \times 2.2 =$ .... **(24)** $66.7 \div 1000 =$ ....

(25) $12474 \div 231 =$ ....

(26) Using the opposite Venn diagram , find :



[a] $A \cup B$ **[b]** $A \cap B$

[c] $B - A$ **[d]** $\acute{B}$

(27) Draw the triangle ABC in which
AB = BC = CA = 6 cm. , then draw $\overline{AD} \perp \overline{BC}$
, then find the length of $\overline{BD}$ and m ($\angle$ B)

(28) Arrange in a descending order : $7\frac{1}{6}$, 5.3 , $7\frac{1}{11}$, $5\frac{4}{7}$ and 6

....

(29) Write all the subsets of the set $X = \{a, b\}$
What is the number of subsets of the set X ?

....

(30) A bag contains 5 white balls , 9 red balls and 6 black balls , all the balls are identical and equal in size , if a ball is drawn randomly. What is the probability that the drawn ball is :

[a] White. **[b]** Not white. **[c]** White or red.



Model 14

Answer the following questions :

1 ***Choose the correct answer :***

(1) $\{4, 5\}$ .... $\{2, 3, 7\}$ ($\in$ or $\notin$ or $\subset$ or $\not\subset$)

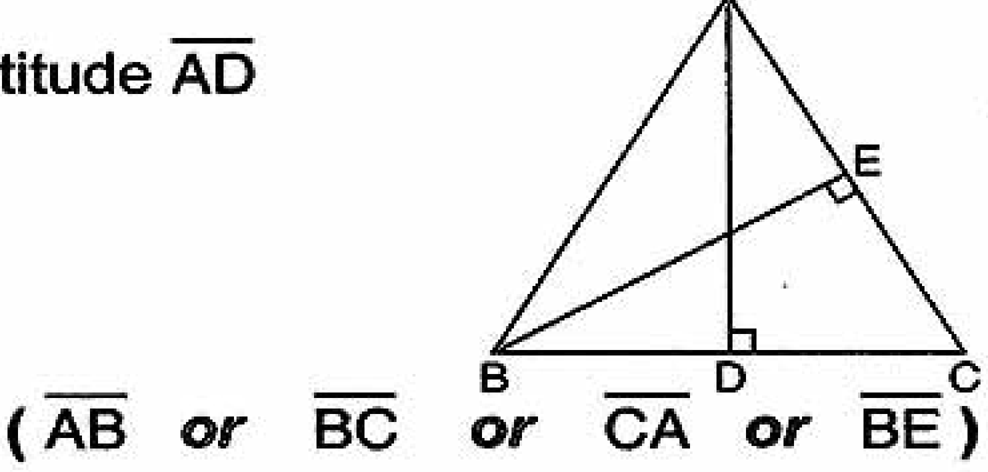
(2) The number of altitudes of the triangle is ....
(zero or 1 or 2 or 3)

(3) $3\frac{1}{2} \div \frac{7}{12} =$ .... (6 or $\frac{18}{2}$ or $\frac{50}{12}$ or 4)

(4) If the length of the radius of a circle is 5 cm. , then the length of the longest chord = ... cm. (2 or 8 or 6 or 10)

(5) 254 hours $\simeq$ .... days. (11 or 10 or 12 or 9)

(6) **In the opposite figure :**
The corresponding base of the altitude $\overline{AD}$ is ....



($\overline{AB}$ or $\overline{BC}$ or $\overline{CA}$ or $\overline{BE}$)

(7) 55.241×100 .... 552.41×10 (< or = or > or ≠)

(8) If $\{3, 4\} = \{1 + y, 4\}$, then y = ...
(7 or 4 or 2 or 5)

(9) 2.7×3.5 .... 0.27×35 (≠ or < or = or >)

(10) $12.5 + 7.632 \simeq$ .... (to the nearest $\frac{1}{100}$)
(20.132 or 20.133 or 20.13 or 2.013)

(11) 7 .... $\{17, 77\}$ ($\in$ or $\notin$ or $\subset$ or $\not\subset$)

(12) $\varnothing$ .... $\{2, 4\}$ ($\in$ or $\notin$ or $\subset$ or $\not\subset$)

(13) The probability of the certain event = ...
(0 or 0.5 or 1 or 2)

(14) If $X - Y = X$, then $X \cap Y =$ .... (X or Y or U or $\varnothing$)

2 ***Complete the following :***

(15) Any line segment whose endpoints are on the circle is called ....

(16) The probability of an impossible event = ...



(17) The midpoint of any diameter in a circle is .... of the circle.

(18) 57.35 + 21.53 = ... ≃ .... (to the nearest tenth)

(19) $\{2, 3, 6, 12\} \cap$ the set of factors of the number 6 = ...

(20) If $6 \in \{3, 5, 2x\}$, then x = ...

---

3 *Answer the following :*

(21) 6.7898 – 4.247 = ... ≃ .... (to the nearest thousandth)

(22) $\frac{5}{7} \times 1\frac{2}{5}$ = ...

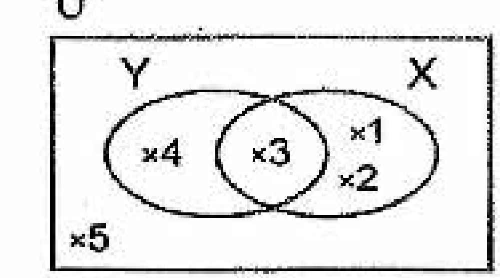
(23) 7885 ÷ 1000 = ...

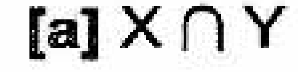
(24) 26272 ÷ 821 = ...

(25) What is the number which if multiplied by 0.5 the product will be 33.86

....

(26) Look at the opposite Venn diagram and find :




[a] $X \cap Y$

[b] $X \cup Y$

[c] $X - Y$

[d] $Y^{`}$

(27) Draw the triangle ABC in which

AB = BC = 6 cm. and m (∠ B) = 120°

, then draw $\overline{AD} \perp \overleftrightarrow{BC}$ which intersects it at D

, then find the length of $\overline{AD}$

(28) A bag contains 3 white balls , 7 red balls , and 5 yellow balls.
All the balls are equal in size. If a ball is drawn randomly :

[a] What is the probability that the drawn ball is white.

[b] What is the probability that the drawn ball is not red.

(29) A car covers equal distances in equal times. If this car covered 24.73 km. in one hour , how many km. are covered in $2\frac{1}{2}$ hours?

....

(30) A metal coin was thrown once , find the probability of appearing a head.

....

Model 15

Answer the following questions :

1 *Choose the correct answer :*

(1) The probability of the impossible event = ...

($\varnothing$ or zero or 1 or $\frac{1}{3}$)

(2) The number of the altitudes of the triangle = ...

(0 or 1 or 2 or 3)

(3) If $X \subset Y$, then $X \cap Y$ = ...

(X or Y or $\varnothing$ or U)

(4) 46.432 ≃ 46.43 approximated to the nearest ....

(ten or 0.1 or 0.01 or 0.001)

(5) If {3 , 4} = {1 + y , 3} , then y = ...

(7 or 4 or 2 or 3)

(6) 40 days ≃ .... weeks. (4 or 6 or 5 or 7)

(7) 17.947 ≃ .... (to the nearest hundredth)

(17.948 or 17.95 or 17.90 or 17.94)

(8) {2 , 3} .... {5 , 7 , 8} ($\in$ or $\notin$ or $\subset$ or $\not\subset$)

(9) 95.3 × 100 = ... (0.953 or 953 or 9530 or 9.53)

(10) As throwing a die once , then the probability of appearing a number less than 3 = ... ($\frac{1}{6}$ or $\frac{1}{2}$ or $\frac{1}{3}$ or $\frac{2}{5}$)

(11) 1.7 ÷ 10 = ... (17 or 0.17 or 1.7 or 0.017)

(12) 254 hours ≃ .... days. (11 or 10 or 12 or 9)

(13) The chord which passes through the centre of the circle is called ....

(a diameter or a radius or a centre or a side)

(14) 255 ÷ 25 = 2.55 ÷ .... (2.5 or 0.25 or 25 or 2500)

2 *Complete the following :*

(15) If {8 , 6 , 7} = {x , 8 , 7} , then x = ...

(16) 7.64 × 0.93 ≃ .... (to the nearest thousandth)



(17) The probability of the certain event = ...

(18) 8.3 tons = ... kg.

(19) $\frac{7}{8} \simeq$ .... (to the nearest hundredth)

(20) $\{1, 2\} \cup \{2, 3\}$ = ...

3 ***Answer the following :***

(21) 8 096 ÷ 253 = ...

(22) $5\frac{1}{3} \times 9$ = ...

(23) $4\frac{1}{2} \div 1.5$ = ...

(24) Which is greater $\frac{5}{8}$ or 0.5734 ?
Find the difference between the two fractions.

....

(25) If the universal set U = the set of all factors of the number 12
, $X = \{1, 3, 2, 6\}$ and $Y = \{1, 4, 6, 3\}$
Draw Venn diagram which represents the sets U , X and Y
, then find : $X \cup Y$, $X - Y$, $\acute{Y}$, $(\acute{X})$

(26) Write all the subsets of the set $X = \{a, b\}$, what is the number of subsets ?

....

(27) Draw Δ ABC where AB = 4 cm.
, BC = 6 cm. and CA = 8 cm.
, then draw a circle of centre B
and its radius length = 4 cm.
From the drawing complete :

[a] The point A lies .... the circle.

[b] The point C lies .... the circle.

[c] $\overline{AB}$ is called .... in the circle.

(28) Find the area of the rectangle of 15.5 meters length and 7.5 meters width.

....

(29) When rolling a regular number cube. What is the probability of getting :

[a] A number more than 6 ?

[b] A number less than or equal to 6 ?

What is the name of the event in each case ?

....



(30) A sample of 40 balls , 5 are red and the rest is in different colours.
What is the predicted number of red balls when the sample contains 400 balls ?

....

Model 16

Answer the following questions :

1 ***Choose the correct answer :***

(1) 55.241 × 100 .... 552.41 × 10 (> ***or*** = ***or*** < ***or*** ≠)

(2) △ ABC is an equilateral triangle of side length 5 cm. , then its perimeter = ... cm. (20 ***or*** 25 ***or*** 8 ***or*** 15)

(3) 355 ÷ 18 = 3.55 ÷ .... (0.18 ***or*** 1.8 ***or*** 18 ***or*** 180)

(4) 3.658 ≃ 3.66 approximated to the nearest .... (100 ***or*** $\frac{1}{10}$ ***or*** $\frac{1}{100}$ ***or*** $\frac{1}{1000}$)

(5) If $X \subset Y$, then $X \cap Y$ = ... (U ***or*** X ***or*** Y ***or*** ∅)

(6) The probability of impossible event is .... (1 ***or*** ∅ ***or*** zero ***or*** 7)

(7) The number of the altitudes of the triangle is .... (3 ***or*** 2 ***or*** 1 ***or*** zero)

(8) ∅ .... {3 , 5} (∈ ***or*** ∉ ***or*** ⊂ ***or*** ⊄)

(9) The measure of right angle .... The measure of obtuse angle (> ***or*** < ***or*** = ***or*** ≥)

(10) 3.002 kilograms = ... grams. (30.02 ***or*** 0.3002 ***or*** 300.2 ***or*** 3002)

(11) {3 , 7} .... {1 , 3 , 5 , 7} (∈ ***or*** ∉ ***or*** ⊂ ***or*** ⊄)

(12) The smallest fraction from the following is .... ($\frac{1}{3}$ ***or*** $\frac{2}{5}$ ***or*** $\frac{5}{8}$ ***or*** $\frac{2}{9}$)

(13) $1\frac{1}{2} \div \frac{1}{4}$ = ... (2 ***or*** 6 ***or*** $\frac{3}{8}$ ***or*** 12)

(14) 35.241 × 100 = 3524.1 (✔ ***or*** ✘)

2 Complete the following :

(15) The longest chord in a circle is ....

(16) If $6 \in \{3 , 5 , 2x\}$, then $x =$ ....

(17) $12\frac{1}{2} \div 6\frac{1}{4} =$ ....

(18) The midpoint of any diameter in a circle is .... of the circle.

(19) $5.0452 \simeq$ .... (to the nearest hundredth)

(20) As throwing a fair die once , then the probability of getting a number less than 3 = ...

3 Answer the following :

(21) $5.7258 \times 9 \simeq$ .... (approximate to the nearest thousandth)

(22) $18.768 \div 8 \simeq$ .... (approximate to the nearest hundredth)

(23) $13409 \div 253 =$ ....

(24) $\{2 , 5 , 8\} - \{3 , 5 , 7\} =$ ....

(25) $2.5 \times 4.42 =$ ....

(26) If the universal set $U = \{x : x$ is an odd number less than $15\}$, $X = \{1 , 3 , 5\}$, $Y = \{1 , 5 , 9 , 13\}$
Draw a Venn diagram which represents the sets U , X , Y , then find : $X \cap Y$, $X - Y$ and Y'

(27) Find the product of 23.49×4.2 and approximate it to the nearest hundredth.

....

(28) A barrel has 236.25 kgs of oil , if we want to pack it in bottles where every bottle holds 0.75 kgs. Find the number of bottles.

....

(29) Draw a circle M whose radius length is equal to 3.5 cm. , then draw its diameter $\overline{AB}$ and label any point $C \in$ the circle.
Draw the triangle ABC and draw $\overline{CD} \perp \overline{AB}$ where $D \in \overline{AB}$, find the length of $\overline{CD}$?

(30) As throwing a fair die once , calculate the probability of :

[a] Appearing a number greater than 6

[b] Appearing an even number greater than 4

[c] Appearing an even prime number.

Model 17

Answer the following questions :

1 ***Choose the correct answer :***

(1) 32 .... $\{3, 2, 5\}$ ($\in$ or $\notin$ or $\subset$ or $\not\subset$)

(2) A letter of the word "ALEXANDRIA" is selected randomly , then the probability of selecting the letter "A" = ...

($\frac{3}{7}$ or $\frac{3}{10}$ or $\frac{1}{3}$ or $\frac{1}{2}$)

(3) $\varnothing$ .... $\{0, 7\}$ ($\in$ or $\notin$ or $\subset$ or $\not\subset$)

(4) The number of the altitudes of the acute-angled triangle is ....

(1 or 2 or 3 or 0)

(5) $63.594 \simeq 63.6$ (to the nearest ....)

(0.1 or 0.01 or 0.001 or 10)

(6) $3\frac{1}{2} \div \frac{7}{12}$ = ... (6 or $\frac{18}{2}$ or $\frac{50}{12}$ or 4)

(7) $\{3\}$ .... $\{303, 13\}$ ($\in$ or $\notin$ or $\subset$ or $\not\subset$)

(8) The chord which passes through the centre of the circle is called ....

(a diameter or a radius or a centre or a side)

(9) $135.42 \div 100$ = ...

(13542 or 13.542 or 1.3542 or 1354.2)

(10) The probability of success of a pupil in an exam is $\frac{4}{5}$, then the probability of his failing is .... ($\frac{1}{2}$ or $\frac{1}{5}$ or $\frac{1}{4}$ or $\frac{2}{9}$)

(11) $14.376 + 15.75 \simeq$ .... (to the nearest hundredth)

(30.131 or 30.13 or 30.12 or 30.10)

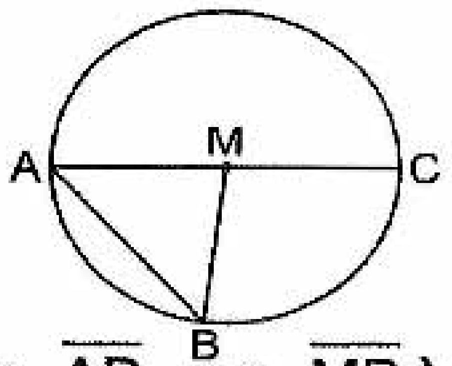
(12) If $\{5, 3\} - \{3, x\} = \varnothing$, then x = ...

(0 or 1 or 5 or 3)



(13) In the opposite figure :

.... is a chord in the circle M



($\overline{MC}$ or $\overline{AM}$ or $\overline{AB}$ or $\overline{MB}$)

(14) $2\frac{1}{4} \times 1\frac{2}{3}$ = ... ($4\frac{1}{4}$ or $3\frac{3}{4}$ or $3\frac{7}{12}$ or $2\frac{2}{12}$)

2 ***Complete each of the following :***

(15) 2.5781 ≃ .... (approximate to the nearest hundredth)

(16) When drawing a paper out of five identical papers numbered 1 , 2 , 3 , 4 and 5 , therefore the probability that the drawn paper has a prime number = ...

(17) X , Y are two sets where $X \subset Y$, then $X \cap Y$ = ...

(18) If M is a circle of radius length 6 cm. and MA = 6 cm. , then the point A located .... the circle M

(19) If $\{3 , 5\} = \{1 + x , 3\}$, then x = ...

(20) To draw a circle whose diameter = 7.2 cm. , set the compasses to a length equal to .... cm.

3 ***Answer the following :***

(21) 3.73×0.8 = ...

(22) $18705 \div 435$ = ...

(23) $178.15 - (9 \times 3.2)$ ≃ .... (approximate to the nearest tenth).

(24) $(471.72 + 8.28) \div 1.5$ = ...

(25) A man bought a TV for L.E. 2000 , He paid L.E. 440 of its cost and paid the remainder on monthly instalments , each of them is equal to L.E. 32.5 Find the number of instalments.

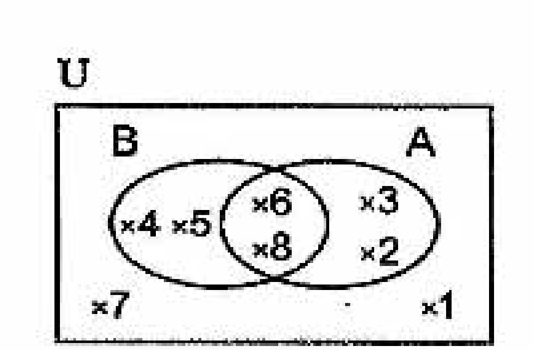
....

(26) Look at the opposite Venn diagram and find :

[a] $A \cup B$

[b] $A - B$

[c] $(A \cup B)`$





(27) Draw a circle whose centre is M and radius length = 3 cm. Draw diameter $\overline{AB}$ Label the points C , D and E where MC = 2 cm. , MD = 5 cm. and ME = 3 cm. , then complete :

[a] $\overline{ME}$ is called .... **[b]** $\overline{AE}$ is called ....

[c] D is located .... the circle.

(28) A family consumes 6.5 kgs of meat monthly where the cost of 1 kg of meat is L.E. 138.5 Find what the family pays. Approximate to the nearest pound.

....

(29) Draw the triangle ABC in which AB = 3 cm. , BC = 4 cm. , CA = 5 cm. , then draw perpendiculars from its vertices to the opposite sides and label the point of their intersection.

(30) Arrange ascendingly : $\frac{2}{3}$, $\frac{3}{4}$, $\frac{1}{2}$ and $\frac{1}{6}$

....

Model 18

Answer the following questions :

1 *Choose the correct answer :*

(1) 1.4 × 8.6 .... 0.86 × 14 (> or < or = or ≠)

(2) If $\{2 , 7\} = \{x + 3 , 2\}$, then x = ...
(2 or 4 or 5 or 7)

(3) $\frac{1}{8} \simeq$ .... (to the nearest $\frac{1}{100}$)
(0.12 or 0.13 or 0.1 or 1.2)

(4) 4.83 + 2.1 ≃ .... (to the nearest tenth)
(6.9 or 7 or 6.8 or 6)

(5) $7 \in \{17 , 77\}$ (✔ or ✘)

(6) $\{25\}$ .... $\{2 , 5\}$ ($\in$ or $\notin$ or $\subset$ or $\not\subset$)

(7) The number of altitudes of in any triangle = ...
(1 or 2 or 3 or 4)

(8) $5\frac{1}{2} \div 1\frac{3}{8} =$ .... (2 or 4 or 8 or 6)

(9) The probability of a certain event = ...

(0 or 1 or 2 or 3)

(10) The number of subsets of the set $\{4, 5\}$ equals ....

(2 or 3 or 4 or 5)

(11) Which of these is 89.0989 approximated to the nearest hundredth ?

(100 or 90 or 89.1 or 89.9)

(12) $\varnothing$ .... $\{1, 2\}$ ($\in$ or $\notin$ or $\subset$ or $\not\subset$)

(13) If $X \subset Y$, then $X \cup Y =$ .... (X or Y or $\varnothing$ or $\grave{X}$)

(14) $54.593 \simeq 54.6$ to the nearest ....

($\frac{1}{10000}$ or $\frac{1}{10}$ or $\frac{1}{100}$ or $\frac{1}{1000}$)

2 ***Complete the following :***

(15) $\{5, a, 8\} = \{b, 9, 8\}$, then a = ... , b = ...

(16) $278.25 - (8 \times 4.5) \simeq$ .... (to the nearest tenth)

(17) The triangle which the measures of its angles are 50° , 90° and 40° is called .... -angled triangle.

(18) **In the opposite figure :**

[a] .... is called a diameter in the circle M

[b] $\overline{YZ}$ is called a .... in the circle M

[c] Each of $\overline{XM}$, $\overline{YM}$ and $\overline{ZM}$ is called .... in the circle M



(19) $\{1, 2, 3, 4\} \cap$ The set of the prime numbers = ...

(20) The probability that Khaled wins a game is $\frac{2}{3}$, then the probability of losing the same game is ....

3 ***Answer the following :***

(21) $471.72 - 351.4 =$ ....

(22) $37.4 \times 6.8 =$ ....

(23) $54.7 \div 100 =$ ....

(24) $4773 \div 129 =$ ....

(25) Find the area of rectangle whose length is 6.25 cm. and its width is 2.6 cm.

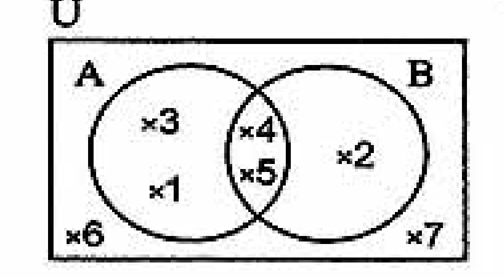
....



(26) Draw the triangle ABC in which AB = 7 cm. , BC = 6 cm. and AC = 6 cm.

....

(27) By using the opposite figure , find :



[a] A ∪ B **[b]** A – B

[c] A ∩ B **[d]** B – A

[e] À **[f]** B̀

(28) Arrange in a descending order : $14\frac{1}{4}$, 15.025 , 14.375 and $14\frac{1}{8}$

....

(29) A box contains 5 white balls , 9 red balls and 6 black balls , if a ball is drawn randomly. Find the probability that the drawn ball is :

[a] White ball **[b]** Not white ball. **[c]** Yellow ball.

(30) A car covers equal distances in equal times. If this car covered 24.73 km. in one hour. How many km. are covered in $2\frac{1}{2}$ hours ?

....

Model 19

Answer the following questions :

1 *Choose the correct answer :*

(1) If {4 , 8} = {1 + y , 4} , then y = ...

(3 *or* 4 *or* 6 *or* 7)

(2) The probability of the impossible event = ...

(∅ *or* 0 *or* 0.5 *or* 1)

(3) 572.4 cm. .... 57.24 m. (< *or* = *or* > *or* ≥)

(4) 3 .... {13.303} (⊂ *or* ⊄ *or* ∈ *or* ∉)

(5) If $\frac{2}{5} = \frac{a}{15}$, then a = ... (3 *or* 5 *or* 6 *or* 7)

(6) 5 .... {3 , 5} ∩ {4 , 7} (∈ *or* ∉ *or* ⊂ *or* ⊄)

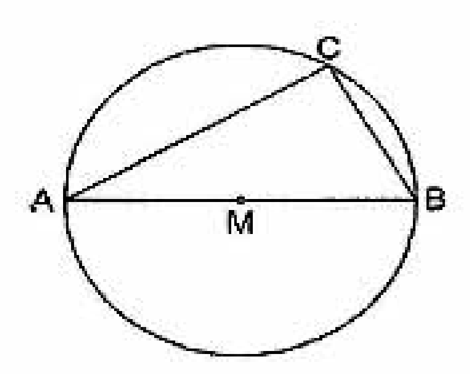
(7) The number of altitudes of any triangle is ....

(1 *or* 2 *or* 3 *or* 4)



(8) **In the opposite figure :**

The longest chord in the circle M is ....



($\overline{MA}$ or $\overline{AB}$ or $\overline{AC}$ or $\overline{CB}$)

(9) ten tenths = ... (100 or 1 or 10 or 0.1)

(10) 327 ÷ 24 = 3.27 ÷ .... (24 or 2.4 or 0.24 or 240)

(11) $\{32, 4\}$ .... $\{3, 2, 4\}$ ($\in$ or $\notin$ or $\subset$ or $\not\subset$)

(12) If $\{2, a+2\} \not\subset \{2, 4, 6, 8\}$, then a = ...

(2 or 4 or 6 or 8)

(13) 3.6 × 100 = ... (0.036 or 36 or 0.36 or 360)

(14) If $X \subset Y$, then $X \cap Y$ = ... (X or Y or $\grave{X}$ or $\grave{Y}$)

2 ***Complete each of the following :***

(15) 1.53 m. = ... cm.

(16) 3.367 + 2.26 = ... ≃ .... (to the nearest tenth)

(17) If $\{3, 4\} \subset \{2, 3, a-1\}$, then a = ...

(18) A circle of radius length 4 cm., then its diameter length = ... cm.

(19) $1\frac{1}{2} \div \frac{3}{4}$ = ...

(20) 60 days ≃ .... weeks.

3 ***Answer the following :***

(21) 8.43 × 0.9 = ... ≃ .... $\left(\text{to the nearest } \frac{1}{100}\right)$

(22) $39\frac{2}{5} - 7.25$ = ... ≃ .... (to the nearest unit)

(23) $4\frac{1}{8} \times 2\frac{2}{3}$ = ...

(24) $\frac{3}{7}$ ≃ .... (to the nearest thousandth)

(25) Rearrange the following numbers in a descending order :

$\frac{1}{2}$, 0.8, $\frac{1}{4}$ and 0.3

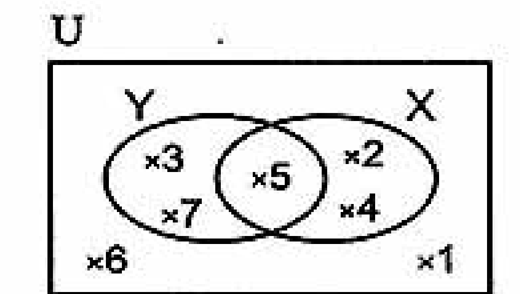
....



(26) If a car transfers 125 boxes of oranges , how many times can this car transfer 4375 boxes ?



(27) From the opposite figure , find :



[a] $X \cup Y$ [b] $X \cap Y$

[c] $X - Y$ [d] $X`$

(28) Write all subsets of the set $\{2 , 3\}$

....

(29) Draw a circle of diameter length 6 cm.
, then draw the diameter $\overline{BC}$ and the chord $\overline{BA}$ of length 3 cm.

(30) A card was drawn from numbered cards from 1 to 10 randomly.
Find the probability of the drawn card to be :

[a] Odd number. [b] Prime number.

Model 20

Answer the following questions :

1 ***Choose the correct answer :***

(1) 276.532 ≃ .... (to the nearest hundredth)
(227 *or* 276.53 *or* 276.54 *or* 276.5)

(2) 27.54 × .... = 275.4
(10 *or* 100 *or* 1000 *or* 10000)

(3) 39 days ≃ .... weeks (to the nearest week)
(5 *or* 6 *or* 7 *or* 8)

(4) 9 .... $\{3 , 6 , 9 , 12\}$ ($\in$ *or* $\notin$ *or* $\subset$ *or* $\not\subset$)

(5) The number of subsets of $\{1 , 7\}$ equals ....
(2 *or* 3 *or* 4 *or* 5)

(6) $\{3 , 4\}$ .... $\{143\}$ ($\in$ *or* $\notin$ *or* $\subset$ *or* $\not\subset$)

(7) If $\{10 , 7\} = \{10 , x + 4\}$, then $x =$ ....
(3 *or* 4 *or* 5 *or* 6)

(8) If the radius length of a circle is 2 cm. , then its diameter length is .... cm. (3 or 4 or 5 or 6)

(9) {5} .... {2 , 3 , 4 , 5} ($\in$ or $\notin$ or $\not\subset$ or $\subset$)

(10) 0.068 × 1000 .... 0.68 × 100 (< or > or = or ≠)

(11) The right-angled triangle has only one altitude. (✓ or ✗)

(12) 32.5 × 7 = ... (2275 or 227.5 or 22.75 or 2.275)

(13) As throwing a fair die once and observing the appearing number on the upper face , then the probability of appearing a number divisble by 2 is .... ($\frac{1}{2}$ or $\frac{5}{6}$ or $\frac{2}{3}$ or $\frac{1}{3}$)

(14) As throwing a metallic coin once , then the probability that a tail appears is .... ($\frac{1}{4}$ or $\frac{3}{4}$ or 1 or $\frac{1}{2}$)

2 ***Complete each of the following :***

(15) $1\frac{1}{2} \div 3\frac{3}{4}$ = ...

(16) {5 , 6} ∩ {4 , 5} = ...

(17) The longest chord in the circle is called ....

(18) 8.2487 × 10 = ... ≃ .... (to the nearest hundredth)

(19) The probability of the sure event = ...

(20) The triangle which the lengths of its sides are equal is called ....

3 ***Answer the following :***

(21) 5.3 × 34.7 = ...

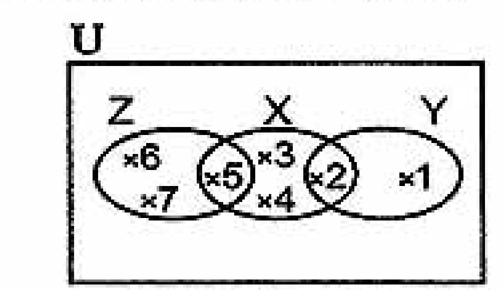
(22) 84.61 + 23.473 = ... ≃ .... (to the nearest $\frac{1}{100}$)

(23) 66.7 ÷ 10 = ...

(24) A truck can carry 162 boxes. Find the number of trips needed to transport 19 440 boxes.

....

(25) By using the opposite Venn diagram , find :



[a] X ∩ Z [b] X ∪ Y

[c] X − Z [d] $\acute{X}$

(26) Draw the equilateral triangle ABC whose side length is 6 cm. , then draw the three altitudes of this triangle.



(27) A box contains 20 cards numbered from 1 to 20 , if a card is drawn randomly. Calculate the probability that the drawn card carries :

[a] An odd number. [b] A number divisible by 7
[c] An even number. [d] A prime number.

(28) Arrange in an ascending order : $\frac{1}{4}$, 0.7 , $\frac{1}{8}$ and 0.33

....

(29) Write the subsets of X = {a , b , c}

....

(30) Put the suitable sign "$\in , \notin , \subset$ or $\not\subset$" :

[a] {3} .... {6 , 11 , 13 , 30} [b] 2 .... {2 , 7}
[c] $\varnothing$ .... {16 , 6} [d] 24 .... {2 , 4}

Model 21

Answer the following questions :

1 *Choose the correct answer :*

(1) The number of all subsets of the set A = {1 , 2} is ....
(3 *or* 4 *or* 5 *or* 6)

(2) If the following fractions $\frac{3}{\square}$, $\frac{4}{\square}$ and $\frac{5}{\square}$ are in their simplest form , then $\square$ = ... (12 *or* 13 *or* 14 *or* 15)

(3) {1.3} .... {13} ($\in$ *or* $\notin$ *or* $\subset$ *or* $\not\subset$)

(4) The altitudes of .... -angled triangle intersect in one point outside the triangle. (right *or* acute *or* obtuse *or* scalene)

(5) The diameter of a circle divides it into two congruent parts.
(✓ *or* ×)

(6) $\frac{1}{3} + \frac{2}{3}$ = ... (1 *or* $\frac{3}{6}$ *or* $\frac{2}{3}$ *or* $\frac{2}{6}$)

(7) {1 , 2 , 3 , ...} is .... set.
(a finite *or* an infinite *or* an empty)

(8) 10 halves $\square$ 15 fifths (< *or* > *or* = *or* ≤)

(9) The length of the radius = ... the length of the diameter in the same circle. (double *or* half *or* triple *or* quarter)



(10) $9.64 \div 4 =$ .... (241 *or* 2.41 *or* 1.96 *or* 38.56)

(11) $736.592 \simeq 736.59$ to the nearest ....
(tens *or* tenth *or* hundredth *or* thousandth)

(12) $\frac{7}{9}$ .... $2\frac{1}{9}$ ($<$ *or* $=$ *or* $>$ *or* $\geq$)

(13) $\varnothing$ .... $\{0\}$ ($\subset$ *or* $\not\subset$ *or* $\in$ *or* $\notin$)

(14) The probability of an impossible event = ...
($\varnothing$ *or* 1 *or* 0 *or* $\frac{1}{2}$)

2 ***Complete the following :***

(15) $35.17 + 4.21 =$ .... $\simeq$ .... (to the nearest tenth)

(16) If $\{1, 5\} \subset \{1, 3, x, 7\}$, then $x =$ ....

(17) 5146 gm. = ... kg.

(18) The longest chord in the circle is called ....

(19) $\{2, 4, 7\} \cup \{1, 4, 7\} =$ ....

(20) It is .... that the sun rises from the west.

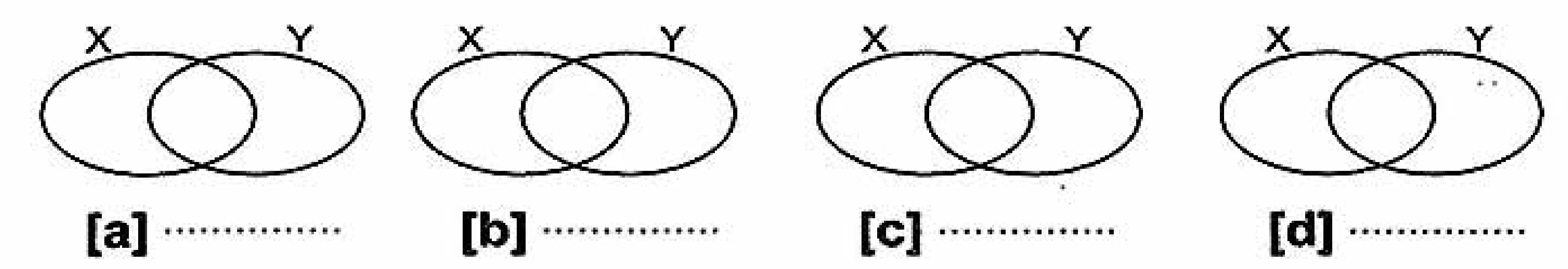
3 ***Answer the following :***

(21) $2\frac{1}{2} \times 1\frac{1}{5} =$ .... (22) $5328 \div 222 =$ ....

(23) $4.28 + 6.375 =$ .... $\simeq$ .... (to the nearest 0.01)

(24) $6.37 \times 1.4 =$ ....

(25) Write what is represented by shaded part in each diagram :



[a] .... [b] .... [c] .... [d] ....

(26) Draw a circle whose centre is M and radius length is 2.5 cm. , then draw its diameter $\overline{AB}$ and draw its chord $\overline{AC}$ of length 3 cm. , then draw $\overline{BC}$ and find its length.



(27) If U is the set of whole numbers which less than 10 , $X = \{2, 3, 5\}$ and $Y = \{3, 4, 5, 7\}$, then find :

[a] $X \cap Y$ **[b]** $X \cup Y$ **[c]** $X - Y$

[d] X' **[e]** $(Y - X)'$

(28) If we want to distribute 11 700 pounds equally among 325 persons. Find the share of each one.

....

(29) Draw the equilateral triangle ABC with side length 5 cm.

(30) As throwing a fair die once , calculate the probability of :

[a] Appearing a number greater than 6

[b] Appearing an even number greater than 4

[c] Appearing an even prime number.

Model 22

Answer the following questions :

1 ***Choose the correct answer :***

(1) If $X \subset Y$, then $X \cap Y =$ .... (X or Y or $\varnothing$ or U)

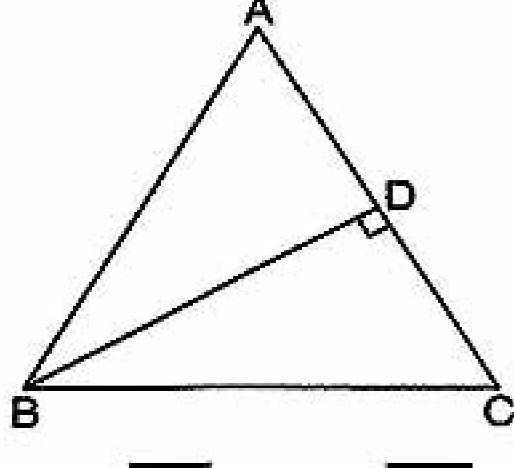
(2) The greatest number in the given is ....

(0.555 or $\frac{3}{5}$ or 0.57 or $\frac{2}{3}$)

(3) In $\triangle ABC$, ...

is the corresponding.

base to the altitude $\overline{BD}$



($\overline{AB}$ or $\overline{BC}$ or $\overline{AC}$ or $\overline{DC}$)

(4) $\{35\}$ .... $\{1, 2, 3, 5\}$ ($\in$ or $\notin$ or $\subset$ or $\not\subset$)



(5) As throwing a fair die once , then the probability of appearing the number 4 equals .... ($\frac{1}{2}$ or $\frac{1}{6}$ or $\frac{5}{6}$ or $\frac{2}{3}$)

(6) 99.241 × 100 .... 992.41 × 10 (> or < or = or ≠)

(7) 43 days ≃ .... weeks (4 or 6 or 5 or 7)

(8) 5 .... {15 , 55} (∈ or ∉ or ⊂ or ⊄)

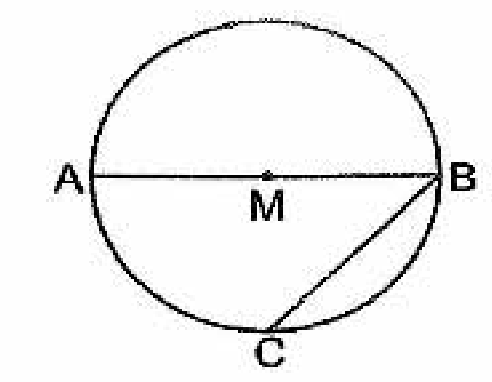
(9) 572.4 cm. ≃ .... (to the nearest metre)
(5 or 6 or 500 or 600)

(10) If a ∈ X , then a .... $\grave{X}$ (∉ or ⊄ or ⊂ or ∈)

(11) 1.25 × 0.1 .... 1.25 ÷ 0.1 (< or > or = or ≥)

(12) The number of altitudes of the right-angled triangle is ....
(0 or 1 or 2 or 3)

(13) **In the opposite figure :**
.... is a diameter
in the circle M



($\overline{AM}$ or $\overline{BC}$ or $\overline{BM}$ or $\overline{AB}$)

(14) $\frac{2}{3}$ .... $\frac{3}{4}$ (> or = or < or ≥)

2 *Complete the following :*

(15) ∅ .... { x , y}

(16) 806.5 ÷ 100 = ...

(17) If X ⊂ Y , then X ∪ Y = ...

(18) The longest chord in the circle is called ....

(19) If 8 ∈ {3 , 7 , x} , then x = ...

(20) As tossing a metallic coin once , then the probability of appearing a head = ...



3 ***Answer the following :***

(21) $30.374 + 21.8 = \cdots\cdots \simeq \cdots\cdots$ (to the nearest $\frac{1}{100}$)

(22) $12\frac{1}{2} \div 4\frac{1}{4} = \cdots\cdots$

(23) $34.125 \times 100 = \cdots\cdots$

(24) $2.7 \times 0.5 = \cdots\cdots$

(25) $\{3, 4, 7\} \cup \{2, 4, 7\} = \cdots\cdots$

(26) Arrange the following numbers descendingly :

3.4 , 0.0333 , 0.3033 and 0.3303

....

(27) A truck can hold 125 boxes of oranges at a time. How many times are needed to deliver 4375 boxes by that truck ?

....

(28) If the universal set $U = \{x : x \text{ is an odd number less than } 15\}$, $X = \{1, 3, 5\}$, $Y = \{1, 5, 9, 13\}$
Draw Venn diagram which represents the sets U , X , Y , then
find : $X \cap Y$, $X - Y$ and $\grave{Y}$

(29) A bag contains 5 white balls , 9 red balls and 6 black balls , all the balls are identical and equal in size , if a ball is drawn randomly.
What is the probability that the drawn ball is :

[a] White. [b] White or red.

(30) Draw the triangle ABC in which
$AB = BC = 6$ cm. and $m(\angle B) = 60°$
, then draw $\overline{AD} \perp \overline{BC}$ which intersects it at D , then find the length of $\overline{AD}$

Model 23

Answer the following questions :

1 ***Choose the correct answer :***

(1) $355 \div 18 = 3.55 \div \cdots\cdots$ (1.8 *or* 0.18 *or* 18 *or* 1800)

(2) $\{7, 2\} \cdots\cdots \{1, 2, 4, 17\}$ ($\in$ *or* $\notin$ *or* $\subset$ *or* $\not\subset$)

(3) $5.3746 \simeq \cdots\cdots$ (to the nearest 0.01)

(5.38 *or* 5.375 *or* 5.37 *or* 5.374)



(4) The probability of the impossible event = ...

($\varnothing$ or 0 or $\frac{1}{2}$ or 1)

(5) $\{3\}$ .... $\{1, 3, 5\}$ ($\in$ or $\notin$ or $\subset$ or $\not\subset$)

(6) The number of altitudes of any triangle is ....

(zero or 1 or 2 or 3)

(7) $32.25 \times 100 =$ .... (3225 or 32250 or 322.5 or 0.3225)

(8) The longest chord in the circle is called ....

(a diameter or a side or a radius or a centre)

(9) 43 days $\simeq$ .... weeks (to the nearest week)

(4 or 5 or 6 or 7)

(10) If $6 \in \{2, 2x, 7\}$, then $x =$ ....

(2 or 3 or 4 or 6)

(11) The triangle which the measures of its angles are 50°, 90° and 40° is called .... -angled triangle.

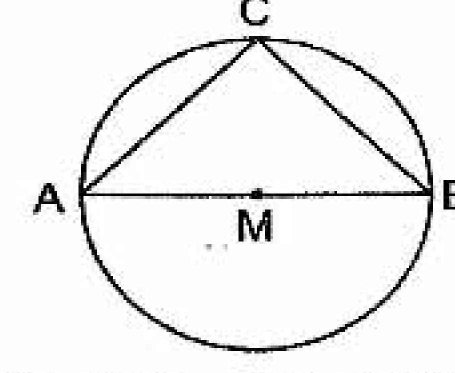
(acute or right or obtuse or isosceles)

(12) If $X - Y = \varnothing$, then X .... Y ($\in$ or $\notin$ or $\subset$ or $\not\subset$)

(13) As throwing a fair die once and observing the appearing number on the upper face, then the probability of appearing an odd number is .... ($\frac{1}{3}$ or $\frac{1}{2}$ or $\frac{5}{6}$ or $\frac{1}{6}$)

(14) **In the opposite figure :**

AM = $\frac{1}{2}$ ....



(AC or MB or BC or AB)

2 ***Complete the following :***

(15) The set of digits of the number 30 772 is ....

(16) 7.657 m. = ... cm.

(17) $A \cup \acute{A} =$ ....





(18) $\frac{5}{7} \times$ .... $= 1$

(19) As tossing a metallic coin once , the probability of appearing a tail is ....

(20) The set factors of the number 6 $\cap$ the set of prime numbers = ...

---

3 ***Answer the following :***

(21) $26.274 + 23.28 =$ .... $\simeq$ .... (to the nearest 2 decimal places)

(22) $3456.821 - 188.725 =$ .... $\simeq$ .... (to the nearest 0.1)

(23) $11655 \div 555 =$ ....

(24) $\frac{3}{4} \times \frac{10}{6} =$ ....

(25) $1.73 \times 2.8 =$ ....

(26) $\{3 , 5 , 4\} - \{2 , 4 , 5 , 7\} =$ ....

(27) From the opposite Venn diagram , find by listing method :

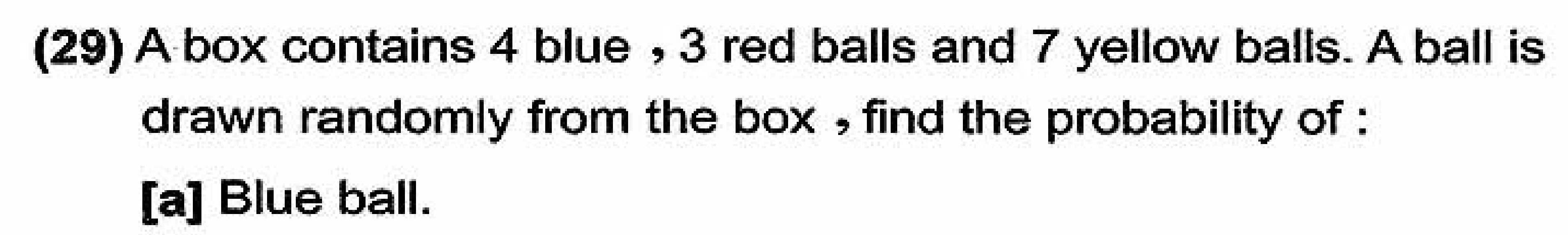
[a] $X \cup Y$ [b] $X \cap Y$

[c] $X - Y$ [d] $X^{`}$

U
X Y
•5 •6 •3 •4 •1 •2
•8 •7

(28) If the price of a piece of sweet is 2.25 pounds.
What is the price of 25 pieces of the same kind ?

....



(29) A box contains 4 blue , 3 red balls and 7 yellow balls. A ball is drawn randomly from the box , find the probability of :

[a] Blue ball.

[b] Not yellow.

(30) Draw a circle M of radius length 5 cm.
, then draw the diameter $\overline{AB}$ and the chord $\overline{AC}$ of length 6 cm. , then draw $\overline{BC}$ and find its length.

Model 24

Answer the following questions :

1 ***Choose the correct answer :***

(1) The probability of that elephant flies = ...

(1 *or* 0 *or* $\frac{1}{2}$ *or* 2)

(2) 7 .... {17 , 77} ($\notin$ *or* $\in$ *or* $\subset$ *or* $\not\subset$)

(3) The sum of the measure of the angles of a triangle = ...°

(118 *or* 90 *or* 180 *or* 108)

(4) 67.5 – 24.38 = ... (43.21 *or* 43.12 *or* 43.28 *or* 43.2)

(5) The diameter length of the circle of radius length 3 cm. = ... cm.

(1 *or* 2 *or* 3 *or* 6)

(6) Perimeter of square = side length × ....

(1 *or* 2 *or* 3 *or* 4)

(7) The number of subsets of the set {4 , 5} equals ....

(2 *or* 3 *or* 4 *or* 5)

(8) The greatest number in the following is ....

(0.111 *or* 1.023 *or* 0.12 *or* 0.123)

(9) 63.7 ÷ 100 = ... (6.370 *or* 637 *or* 0.637 *or* 63.70)

(10) {45} .... {4 , 5} ($\in$ *or* $\notin$ *or* $\subset$ *or* $\not\subset$)

(11) The reciprocal of 2 $\frac{3}{7}$ is .... ($\frac{17}{7}$ *or* $\frac{7}{17}$ *or* $\frac{6}{7}$ *or* $\frac{5}{17}$)

(12) The chord which passes through the centre of the circle is called ....

(a diameter *or* a radius *or* a centre *or* a side)

(13) If {7 , x} = {y , 3} , then x + y = ...

(7 *or* 3 *or* 4 *or* 10)

(14) As tossing a metallic coin once , then the probability of appearing a head or a tail = ... ($\frac{1}{2}$ *or* 0 *or* 1 *or* 0.4)



2 *Complete the following :*

(15) $\{2, 4, 6\} \cap$ the set of the odd numbers = ...

(16) $2\frac{3}{4} \div 1\frac{3}{8}$ = ...

(17) To draw a circle of diameter length 12 cm. , then the opening distance of the compasses should be .... cm.

(18) $17.025 + 6.35 \simeq$ .... = ... (to the nearest $\frac{1}{100}$)

(19) A subset of the sample space is ....

(20) If $A \subset B$, then $A - B$ = ...

3 *Answer the following :*

(21) $10019 \div 233$ = ...

(22) $\{4, 6, 9\} - \{1, 6, 7\}$ = ...

(23) $6\frac{1}{4} \times 3\frac{1}{5}$ = ...

(24) 853.6×100 = ...

(25) If $\frac{1}{3} < \frac{x}{12} < \frac{2}{3}$ where x is an even number , find the value of x

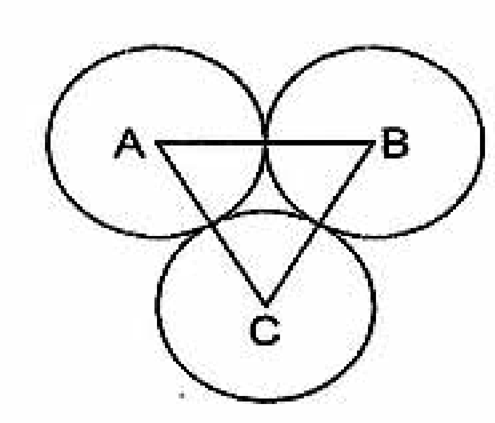
....

(26) *In the opposite figure :*

Three circles of centres A , B and C

of radius length 4 cm. for each.

Find the perimeter of $\triangle ABC$



....

(27) Represent the two sets $A = \{1, 2, 3, 6\}$ and $B = \{2, 3\}$ by Venn diagram , then find : $A \cap B$, $A \cup B$, $A - B$

(28) Find the area of the rectangle whose length is 6.25 m. and its width is 2.5 m. to the nearest hundredth.

....

(29) As throwing a fair die once , calculate the probability of appearing :

[a] A number greater than 3

[b] A number greater than or equal to 3

[c] An odd prime number.

[d] A number divisible by 2



(30) Draw $\triangle ABC$ where AB = 6 cm. , BC = 8 cm. and CA = 10 cm.
Bisect $\overline{AC}$ at M , then draw a circle of radius length 5 cm. and M is its centre , then :

[a] Find two equal line segments in length is the circle M

[b] What is the name of $\overline{AC}$?

Model 25

Answer the following questions :

1 *Choose the correct answer :*

(1) 8.46 dm. = ... cm. (846 *or* 0.846 *or* 84.6 *or* 8 460)

(2) The product of a fraction and its reciprocal is .... (1 *or* 2 *or* 0 *or* 3)

(3) {8 , 1} .... {1 , 8} ($\in$ *or* $\notin$ *or* $\subset$ *or* $\not\subset$)

(4) The number of altitudes in any triangle = ... (1 *or* 2 *or* 3 *or* 4)

(5) $12 \times 2\frac{3}{4}$ = ... (12 *or* 22 *or* 33 *or* 44)

(6) $A \cap \grave{A}$ = ... (U *or* A *or* $\varnothing$ *or* $\grave{A}$)

(7) {1 , 2} .... the set of prime numbers. ($\subset$ *or* $\not\subset$ *or* $\in$ *or* $\notin$)

(8) Any line segment connects between any two points on the circle is called .... (diameter *or* radius *or* chord *or* centre)

(9) If $\frac{3}{7} = \frac{a}{56}$, then a = ... (168 *or* 392 *or* 24 *or* 8)

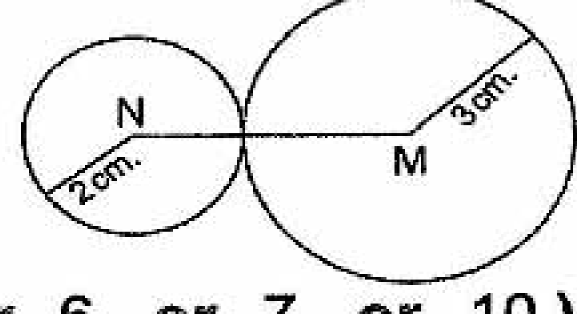
(10) $\frac{7}{13}$ .... $\frac{5}{13}$ (< *or* = *or* > *or* ≤)

(11) If $5 \in \{2 , x + 4 , 7\}$, then x = ... (1 *or* 5 *or* 9 *or* 13)

(12) In the opposite figure :

M and N are two circles

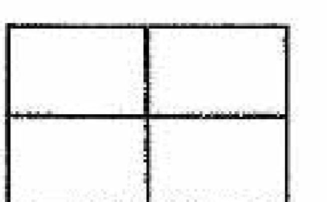
, then length of $\overline{MN}$ = ... cm.



(5 *or* 6 *or* 7 *or* 10)



(13) In the opposite figure :



The number of rectangles is ....

(4 or 6 or 8 or 9)

(14) The probability of getting an even number when rolling a die once = ... ($\frac{1}{6}$ or $\frac{1}{2}$ or $\frac{1}{3}$ or $\frac{5}{6}$)

2 *Complete each of the following :*

(15) All radii are .... in the same circle.

(16) The number of elements of the null set = ...

(17) The altitudes of the right-angled triangle intersect at one point located at ....

(18) A letter is selected randomly from the word "Habiba" , then the probability of selecting the letter "A" is ....

(19) If X and Y belong to the circle M where $M \in \overline{XY}$, then $\overline{XY}$ is called a .... in the circle.

(20) $\frac{4}{7} \approx$ .... (to nearest thousandth)

3 *Answer the following :*

(21) 18.76 + 25.3 = ...

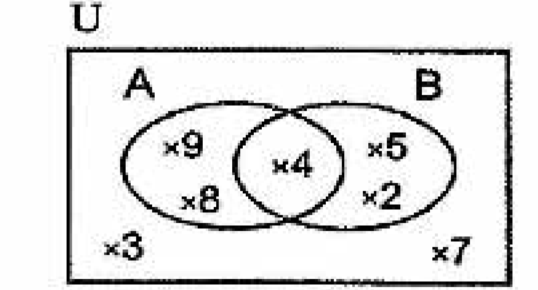
(22) 542.42 ÷ 100 = ...

(23) 0.543 × 2.3 = ...

(24) $\frac{7}{24} \div 3\frac{1}{2}$ = ...

(25) The opposite figure is a Venn diagram.

List each of the following :



[a] A ∩ B

[b] A ∪ B

[c] A – B

[d] À

(26) Arrange the following numbers in an ascending order :

$\frac{1}{2}$, 0.8 , $\frac{1}{4}$ and 0.3

....

(27) Draw the triangle ABC in which

AB = 8 cm. , BC = 6 cm. and AC = 10 cm.

What is the type of $\triangle$ ABC

according to its angles ?

(28) A bag contains 5 white balls , 9 red balls and 6 black balls , all the balls are identical and equal in size. If a ball is drawn randomly. What is the probability that the drawn ball is :

[a] White.   [b] Red.

[c] Not white.   [d] White or red.

(29) A barrel has 113.75 litres. of oil and we want to distribute the oil in bottles where every bottle holds 1.25 litres. Find the number of bottles are needed for that.

....

(30) Draw a circle M of diameter length 6 cm.

, then draw the two radii $\overline{MA}$ and $\overline{MB}$

where m ($\angle$ AMB) = 60° and draw $\overline{AB}$

, find :

[a] The length of $\overline{AB}$

[b] m ($\angle$ A)





Guide Answers of the Main Book

Revision 1

1 [a] 48.89 [b] 26.57 [c] 6
[d] 0.9 [e] 64000

2 [a] $\frac{25}{10} = 2.5$ [b] $\frac{12}{10} = 1.2$ [c] $\frac{11}{10} = 1.1$
[d] $\frac{7}{10} = 0.7$ [e] $\frac{9}{10} = 0.9$ [f] $\frac{38}{10} = 3.8$

3 [a] $2\frac{4}{10} = 2.4$, $2\frac{7}{8} = 2.875$
The order is : 2.25 , $2\frac{4}{10}$, 2.51 and $2\frac{7}{8}$
[b] Draw by yourself.
(1) AC = 4 cm.
(2) The perimeter = 4 + 4 + 4 = 12 cm.
(3) The triangle ABC is an equilateral triangle.

4

Number	Number to the nearest 10	Number to the nearest 100	Number to the nearest 1000	Number to the nearest unit
4723.6	4720	4700	5000	4724
7259.2	7260	7300	7000	7259
64345.97	64350	64300	64000	64346

5 [a] The perimeter of the frame
= (40 + 60) × 2 = 100 × 2 = 200 cm.
= 2 m.
The cost of the frame = 2 × 3 = 6 pounds.
[b]
Amount of money
25
20
15
10
5
0
Jan. Feb. Mar. Apr.
Month

Revision 2

1 [a] 0 , 1 [b] 12 [c] 6
[d] 4 [e] hundred

2 [a] 8.12 [b] 37.25 [c] 2.58
[d] 0.23

3 [a] 63.2 [b] 432.8 [c] 7023.5
[d] 367.8 [e] 24.2 [f] 0.1

4 [a] (1) $4\frac{1}{10}$ (2) $\frac{2}{77}$
[b] (3627 ÷ 100) + 27.36 = 36.27 + 27.36
= 63.63 ≃ 63.6

5 [a] Draw by yourself.
The perimeter = (5 + 2) × 2 = 7 × 2 = 14 cm.
The area = 5 × 2 = 10 cm^2
[b] (1) P (yellow ball) = $\frac{3}{10}$
(2) P (green ball) = 0
(3) P (red ball or yellow ball) = $\frac{5+3}{10} = \frac{8}{10}$

Revision 3

1 [a] (L + W) × 2 [b] $\frac{4}{10} = \frac{12}{30}$ [c] 11
[d] 6.093 [e] 0.03

2 [a] 42 [b] right [c] $\frac{11}{4}$
[d] 0.003 [e] $\frac{5}{7}$

3 [a] 45.77 ≃ 45.8 [b] 439.52 ≃ 440
[c] 821.78 ≃ 820 [d] 231.37 ≃ 231.4

4 [a] $6\frac{1}{4} = 6.25$
The order is : 6.35 , 6.3 , $6\frac{1}{4}$ and 6.2
[b] Draw bt yourself.
The perimeter = 4 × 4 = 16 cm.
The area = 4 × 4 = 16 cm^2

5 [a] 24 = 2 × 2 × 2 × 3
36 = 2 × 2 × 3 × 3
H.C.F. = 2 × 2 × 3 = 12
L.C.M. = 2 × 2 × 2 × 3 × 3 = 72
[b] The multiples are : 15 , 20 , 25 , 30 , 35 and 40

Revision 4

1 [a] 19560 [b] 352882 [c] $\frac{21}{3} = \frac{14}{2}$
[d] $6\frac{4}{7}$ [e] 0.64

2
75.57 → 76
47.39 → 47
$47\frac{2}{3}$ → 48
47.71 → 48
$75\frac{4}{9}$ → 75
$75\frac{3}{7}$ → 75

3 [a] (1) $7\frac{35}{100}$ (2) $6\frac{7}{100}$
(3) $12\frac{56}{100}$ (4) $9\frac{3}{1000}$

[b] 24 = 2 × 2 × 2 × 3
10 = 2 × 5
H.C.F. = 2
L.C.M. = 2 × 2 × 2 × 3 × 5 = 120

4 [a] The rest = 51200 – 9600 = L.E. 41600
The value of each instalment
= 41600 ÷ 16 = L.E. 2600
[b] (1) P (a prime number) = $\frac{3}{6} = \frac{1}{2}$
(2) P (a number divisible by 2) = $\frac{3}{6} = \frac{1}{2}$

5
328 350 382
300 middle 400

328 ≃ 300 (to the nearest hundred)
382 ≃ 400 (to the nearest hundred)
350 ≃ 400 (to the nearest hundred)

Unit One

Exercise 1

1 [a] 76.51 [b] 52.61 [c] 175.33
[d] 21.83 [e] 52.12 [f] 0.74
[g] 23.30 [h] 1.00 [i] 0
[j] 5.69 [k] 2.57 [l] 2.13
[m] 39.00 [n] 3.03 [o] 31.04
[p] 6.22

2 [a] 41.625 [b] 2.051 [c] 0.047
[d] 144.102 [e] 4.680 [f] 20.000
[g] 0 [h] 0.999 [i] 16.003
[j] 8.648 [k] 94.013 [l] 8.002

3 [a] 4.74 [b] 4.740

4

	Number	The number approximated to the nearest			
		Unit	Tenth	Hundredth	Thousandth
[b]	528.2025	528	528.2	528.20	528.203
[c]	537.2983	537	537.3	537.30	537.298
[d]	43.5426	44	43.5	43.54	43.543
[e]	21.84792	22	21.8	21.85	21.848
[f]	0.5297	1	0.5	0.53	0.530
[g]	0.0082	0	0	0.01	0.008
[h]	$\frac{3}{8}$	0	0.4	0.38	0.375

5 [a] 5.35 [b] 2.579 [c] 400
[d] 17.95 [e] hundredth [f] hundredth
[g] ten [h] tenth [i] hundredth
[j] 3.13 [k] 87 [l] 7

6 [a] 14.817 ≃ 14.82 [b] 128.811 ≃ 128.81
[c] 23.3479 ≃ 23.348 [d] 29.126 ≃ 29.13
[e] 606.977 ≃ 606.98 [f] 17.2067 ≃ 17.207
[g] 4.357 ≃ 4.36 [h] 213.635 ≃ 213.64
[i] 88.7575 ≃ 88.758 [j] 6.4884 ≃ 6.488
[k] 2.735 ≃ 2.74 [l] 0.391 ≃ 0.4

7 [a] 73.625 ≃ 73.63 [b] 200.081 ≃ 200.08
[c] 2.222 + 5.555 ≃ 7.78
[d] 762.3 – 267.212 ≃ 495.09

8 The decimal fraction is : 0.2578
• 0.2578 ≃ 0.26 (to the nearest hundredth)
• 0.2578 ≃ 0.258 (to the nearest thousandth)

9 The decimal fraction is : 0.6543
• 0.6543 ≃ 0.7 (to the nearest $\frac{1}{10}$)
• 0.6543 ≃ 0.65 (to the nearest $\frac{1}{100}$)

10 The decimal fraction is : 0.0257
• 0.0257 ≃ 0.03 (to the nearest $\frac{1}{100}$)
• 0.0257 ≃ 0.026 (to the nearest $\frac{1}{1000}$)

11 12.245 , 12.246 and 12.251
(There are other solutions)

12 86.3981 , 86.3982 and 86.3978
(There are other solutions)

13 X + Y = 13.452 + 7.273 = 20.725
≃ 20.73 (to the nearest hundredth)
• Estimate of X = 13 • Estimate of Y = 7
• Estimate of (X + Y) = 13 + 7 = 20
• Since the actual sum is closer to estimate, then the estimation is acceptable.

14 • Estimate of L = 62 • Estimate of M = 33
• Estimate of (L + M) = 62 + 33 = 95
L + M = 62.3724 + 32.7285 = 95.1009
≃ 95.101 (to the nearest thousandth)
• Since the actual sum is closer to estimate, then the estimation is acceptable.

15 [a] 0.19 [b] 0.14 [c] 0.353
[d]

Compound	Weight in (gm.)	Weight approximate to the nearest thousandth
A	0.0032	**0.003**
B	0.0546	**0.055**
C	0.1379	**0.138**

16 The estimation
• 15.25 ≃ 15 • 68.75 ≃ 69
• 64.75 ≃ 65 • 98.25 ≃ 98
• 170.5 ≃ 171 • 28.25 ≃ 28

The estimation of what he paid
$= 15 + 69 + 65 + 98 + 171 + 28$
$= 446 \simeq 450$ (to the nearest ten)
The actual sum of what he paid
$= 15.25 + 68.75 + 64.75 + 98.25 + 170.5 + 28.25 = 445.75$
• Since the actual sum is closer to estimate, then the estimation is acceptable.

17 The length in kilometres $= 74389 \div 1000 = 74.389 \simeq 74.39$ km.

18 The sum of lengths of the two pieces $= 285.95 + 382.275 = 668.225 \simeq 668.23$ m.

19 He sold $= 10.25 + 5.355 = 15.605$ kg.
What left with him $= 20 - 15.605 = 4.395 \simeq 4.40$ kg.

20 [a] 2.788 [b] 20.1226
[c] 9.2366 [d] 19.995

Exercise 2

1 [a] < [b] > [c] > [d] >
[e] > [f] > [g] < [h] <
[i] < [j] > [k] = [l] >

2 [a] $\frac{10}{11}$, $\frac{7}{11}$, $\frac{4}{11}$ and $\frac{2}{11}$
[b] $\frac{13}{7}$, $\frac{11}{7}$, $\frac{9}{7}$, $\frac{5}{7}$ and $\frac{4}{7}$
[c] $1 = \frac{9}{9}$ then the order is : 1, $\frac{7}{9}$, $\frac{5}{9}$ and $\frac{2}{9}$
[d] $\frac{7}{4}$, $\frac{7}{5}$, $\frac{7}{9}$, $\frac{7}{11}$ and $\frac{7}{13}$
[e] $0.5 = \frac{5}{10}$ then the order is : $\frac{14}{10}$, $\frac{9}{10}$, $\frac{7}{10}$, 0.5 and $\frac{2}{10}$
[f] $1\frac{4}{5}$, $1\frac{3}{5}$, $1\frac{2}{5}$ and $1\frac{1}{5}$
[g] $\frac{12}{5}$, $\frac{12}{7}$, $\frac{12}{13}$, $\frac{12}{15}$ and $\frac{12}{17}$
[h] 9, $8\frac{4}{7}$, $8\frac{3}{7}$ and $8\frac{1}{7}$

3 [a] 5, 6 and 7 [b] 7 and 8
[c] 6 and 7 [d] 2, 3 and 4

4 [a] Since $15 = 5 \times 3$, then $a = 2 \times 3 = 6$
[b] Since $8 = 24 \div 3$, then $b = 15 \div 3 = 5$
[c] Since $16 = 2 \times 8$, then $c = 3 \times 8 = 24$

5 [a] $\frac{3}{4} = \frac{15}{20}$, $\frac{2}{5} = \frac{8}{20}$, then $\frac{3}{4} > \frac{2}{5}$
[b] $\frac{5}{8} = \frac{15}{24}$, $\frac{2}{3} = \frac{16}{24}$, then $\frac{5}{8} < \frac{2}{3}$
[c] $\frac{7}{9} = \frac{28}{36}$, $\frac{3}{4} = \frac{27}{36}$, then $\frac{7}{9} > \frac{3}{4}$
[d] $\frac{5}{2} > \frac{3}{5}$
[e] $\frac{4}{5} = \frac{28}{35}$, $\frac{3}{7} = \frac{15}{35}$, then $\frac{4}{5} > \frac{3}{7}$
[f] $\frac{7}{12} = \frac{35}{60}$, $\frac{4}{5} = \frac{48}{60}$, then $\frac{7}{12} < \frac{4}{5}$
[g] $\frac{1}{2} = \frac{6}{12}$, then $\frac{4}{12} < \frac{1}{2}$
[h] $1 > \frac{3}{4}$ [i] $\frac{5}{3} > 1$
[j] $\frac{2}{8} = \frac{1}{4}$, then $\frac{3}{4} > \frac{2}{8}$
[k] $\frac{5}{6} = \frac{20}{24}$, $\frac{7}{8} = \frac{21}{24}$, then $\frac{5}{6} < \frac{7}{8}$
[l] $\frac{5}{6} = \frac{10}{12}$, then $\frac{5}{6} > \frac{7}{12}$
[m] $2\frac{1}{4} < 2\frac{1}{3}$
[n] $3\frac{3}{4} = 3\frac{21}{28}$, $3\frac{5}{7} = 3\frac{20}{28}$, then $3\frac{3}{4} > 3\frac{5}{7}$
[o] $4\frac{2}{3} = 4\frac{8}{12}$, then $4\frac{7}{12} < 4\frac{2}{3}$
[p] $\frac{18}{6} = 3$, then $\frac{18}{6} = 3$
[q] $\frac{8}{5} = 1\frac{3}{5} = 1\frac{18}{30}$, $1\frac{1}{6} = 1\frac{5}{30}$, then $\frac{8}{5} > 1\frac{1}{6}$
[r] $\frac{5}{2} = 2\frac{1}{2} = 2\frac{2}{4}$, then $2\frac{3}{4} > \frac{5}{2}$

6 [a] < [b] < [c] <
[d] > [e] < [f] =

7 [a] ✗ [b] ✓ [c] ✗ [d] ✗
[e] ✓ [f] ✓ [g] ✓ [h] ✓

8 [a] > [b] > [c] < [d] <
[e] > [f] $\frac{7}{8}$ [g] $\frac{19}{20}$ [h] $\frac{2}{9}$

9 [a] $\frac{5}{6} = \frac{20}{24}$, $\frac{3}{4} = \frac{18}{24}$, $\frac{1}{2} = \frac{12}{24}$, $\frac{7}{8} = \frac{21}{24}$
, then the order is : $\frac{1}{2}$, $\frac{3}{4}$, $\frac{5}{6}$ and $\frac{7}{8}$
[b] $\frac{2}{3} = \frac{8}{12}$, $\frac{3}{4} = \frac{9}{12}$, $\frac{5}{6} = \frac{10}{12}$, then the order is : $\frac{5}{12}$, $\frac{2}{3}$, $\frac{3}{4}$, $\frac{5}{6}$ and $\frac{11}{12}$
[c] $4\frac{2}{5} = 4\frac{16}{40}$, $4\frac{5}{8} = 4\frac{25}{40}$, $4\frac{1}{2} = 4\frac{20}{40}$, $4\frac{3}{4} = 4\frac{30}{40}$
, then the order is :
$4\frac{2}{5}$, $4\frac{1}{2}$, $4\frac{5}{8}$, $4\frac{3}{4}$ and $5\frac{1}{4}$
[d] $\frac{6}{8} = \frac{3}{4}$
, then the order is :
$\frac{3}{8}$, $\frac{3}{7}$, $\frac{3}{5}$, $\frac{6}{8}$ and $\frac{3}{2}$

10 [a] $\frac{1}{2} = \frac{10}{20}$, $0.8 = \frac{8}{10} = \frac{16}{20}$, $\frac{1}{4} = \frac{5}{20}$, $0.3 = \frac{3}{10} = \frac{6}{20}$, $\frac{2}{5} = \frac{8}{20}$, then the order is : $\frac{1}{4}$, 0.3, $\frac{2}{5}$, $\frac{1}{2}$ and 0.8
[b] $3.2 = 3\frac{2}{10}$, $3\frac{1}{2} = 3\frac{5}{10}$ So, $3.2 < 3\frac{1}{2}$
, $4\frac{1}{3} = 4\frac{7}{21}$, $4\frac{2}{7} = 4\frac{6}{21}$ So, $4\frac{2}{7} < 4\frac{1}{3}$
, then the order is :
3.2, $3\frac{1}{2}$, $4\frac{2}{7}$, $4\frac{1}{3}$ and 5
[c] $7\frac{1}{6} = 7\frac{11}{66}$, $7\frac{2}{11} = 7\frac{12}{66}$ So, $7\frac{1}{6} < 7\frac{2}{11}$
, $5.3 = 5\frac{3}{10} = 5\frac{21}{70}$, $5\frac{4}{7} = 5\frac{40}{70}$
So, $5.3 < 5\frac{4}{7}$
, then the order is :
5.3, $5\frac{4}{7}$, 6, $7\frac{1}{6}$ and $7\frac{2}{11}$
[d] $\frac{61}{7} = 8\frac{5}{7}$ So, $8 < \frac{61}{7}$
$12.4 = 12\frac{4}{10} = 12\frac{28}{70}$, $12\frac{3}{7} = 12\frac{30}{70}$
So, $12.4 < 12\frac{3}{7}$
, then the order is :
8, $\frac{61}{7}$, $11\frac{4}{5}$, 12.4 and $12\frac{3}{7}$

11 $1\frac{7}{8} = 1\frac{14}{16}$ So, $1\frac{7}{8} > 1\frac{9}{16}$
, then $1\frac{7}{8}$ km. is greater.

12 $\frac{7}{8} = \frac{14}{16}$, $\frac{3}{4} = \frac{12}{16}$
, then the order is : $\frac{5}{16}$ km., $\frac{3}{4}$ km. and $\frac{7}{8}$ km.

13 The fractions are : $\frac{1}{5}$, $\frac{2}{5}$, $\frac{3}{5}$ and $\frac{4}{5}$

14 The fractions are : $\frac{8}{7}$, $\frac{9}{7}$, $\frac{10}{7}$, $\frac{11}{7}$, $\frac{12}{7}$ and $\frac{13}{7}$

15 The fractions are : $\frac{1}{11}$, $\frac{2}{11}$ and $\frac{3}{11}$

Exercise 3

1 [a]

×10					
6.5	1.25	0.17	0.795	0.001	3.151
65	12.5	1.7	7.95	0.01	31.51

[b]

×100					
7.4	0.75	3.765	0.0006	6.01	0.008
740	75	376.5	0.06	601	0.8

[c]

×1000					
2.345	2.54	2.3	0.251	17.09	0.001
2345	2540	2300	251	17090	1

2 [a] 64.3 [b] 31.8 [c] 32
[d] 126.5 [e] 7214 [f] 970
[g] 4.5 [h] 3217.2 [i] 778.7
[j] 341 [k] 6700 [l] 24610
[m] 1840 [n] 75621

3 [a] 56.7 [b] 9870 [c] 617.2
[d] 67 [e] 213 [f] 0.08
[g] 27 [h] 693 [i] 5355
[j] 62.4

4 [a] ✓ [b] ✓ [c] ✗
[d] ✓ [e] ✗ [f] ✗
[g] ✗ [h] ✗ [i] ✓
[j] ✓

5 [a] = [b] > [c] =
[d] > [e] < [f] <
[g] > [h] >

6 [a] 10 [b] 1000 [c] 10
[d] 100 [e] 1000 [f] 1000
[g] 100 [h] 1000 [i] 2.94
[j] 0.255

7 [a] 87020 [b] 3200 [c] 205
[d] 650 [e] 2450 [f] 258.9
[g] 3002 [h] 72890 [i] 373
[j] 3 [k] 507 [l] 5700
[m] 866 [n] 75

8 [a] 748.2 [b] 621 [c] 8779
[d] 12.4 [e] 540.5 [f] 34358.4

9 She saves = 7.75 × 100 = L.E. 775

10 The area = 15.75 × 10 = 157.5 ≃ 158 cm^2

11 [a] 55.2255 , 5.52255 , 0.552255
[b] 0.3 × 20 = 0.3 × 10 × 2
= [0.3 × 10] × 2 = 3 × 2 = 6

Exercise 4

1 [a] 2.88 [b] 6.24 [c] 0.74
[d] 20.7 [e] 4.025 [f] 68.155
[g] 0.157 [h] 1.7056 [i] 0.027
[j] 0.056 [k] 0.09552 [l] 363.14

2 [a] 0.3 [b] 6.552 [c] 8.244
[d] 2.22 [e] 0.1421 [f] 63.92
[g] 10.8031 [h] 4.4712 [i] 180.908
[j] 0.054 [k] 1.876 [l] 0.074
[m] 10.962 [n] 0.0092 [o] 205.41

3 [a] 7.5 [b] 3.42 [c] 9.246
[d] 3.625 [e] 0.3625 [f] 0.7256
[g] 11.85 [h] 2.259 [i] 0.12
[j] 0.48 [k] 6.48 [l] 0.064
[m] 0.036 [n] 0.4375 [o] 0.444
[p] 1.026 [q] 21.76 [r] 0.3

4 [a] 9.2 [b] 1.26 [c] 0.112
[d] 0.0676 [e] 0.1665 [f] 21.08
[g] 100 [h] 7.59 [i] 0.266

5 [a] < [b] < [c] >
[d] = [e] = [f] >
[g] = [h] < [i] >

6 [a] 31.38 [b] 308 [c] 64.95
[d] 150.5 [e] 53 [f] 0.007243
[g] 16.87 [h] 21.5 [i] 0.944
[j] 120

7
[a] The estimation of 5.3 is 5
The estimation of 2.7 is 3
The estimation of the product = 5 × 3 = 15
The actual product = 5.3 × 2.7 = 14.31
It is clear that the estimation is acceptable
[b] The estimation of 18.8 is 19
The estimation of 7.1 is 7
The estimation of the product = 19 × 7 = 133
The actual product = 18.8 × 7.1 = 133.48
It is clear that the estimation is acceptable.
[c] The estimation of 7.82 is 8
The estimation of 4.3 is 4
The estimation of the product = 8 × 4 = 32
The actual product = 7.82 × 4.3 = 33.626
It is clear that the estimation is acceptable.

8 [a] 17.02 [b] 4.366
First : 10.0418 Second : 100.418
The two values are different.

9 In figure (1) :
The perimeter = 3.2 × 4 = 12.8 cm.
In figure (2) :
The perimeter = 3.52 × 3 = 10.56 cm.
In figure (3) :
The perimeter = (8.7 + 4.2) × 2
= 12.9 × 2 = 25.8 cm.

10 The area = 2.4 × 2.4 = 5.76 ≃ 5.8 cm^2.

11 The area = 2.65 × 1.5 = 3.975 ≃ 3.98 cm^2.

12

The item	No. of items	Price of each one	Total
Glasses	6	L.E. 3.25	L.E. 19.5
Dishes	12	L.E. 5.75	L.E. 69
Butter packets	3	L.E. 0.75	L.E. 2.25
Cans	2	L.E. 2.25	L.E. 4.5
Total			L.E. 95.25

13 The total cost = 45.75 × 3 = L.E. 137.25

14 The price of the books = 15.5 × 5 = L.E. 77.5

15 The cost = 2.75 × 15 = L.E. 41.25

16 The cost = 6.45 × 2.4 = L.E. 15.48

17 The price = 5.25 × 6.75 = 35.4375 ≃ L.E. 35

18 The total cost = 12 × 1.75 = L.E. 21
The left = 30 − 21 = L.E. 9

19 The price of fish = 4.5 × 15 = L.E. 67.5
The price of apples = 6 × 5.5 = L.E. 33
She paid = 67.5 + 33 = L.E. 100.5

20 The car covers = 2.25 × 73.25 = 164.8125 km.

21 [a] 22.82 [b] 0.2282 [c] 228.2
[d] 192.4 [e] 19.24 [f] 2.282
[g] 0.1924 [h] 192.4 [i] 0.02282
[j] 3.26 × (7 + 10) = 3.26 × 7 + 3.26 × 10
= 55.42

Exercise 5

1 [a] $\frac{3}{4}\times\frac{5}{7}=\frac{15}{28}$ [b] $\frac{4}{5}\times\frac{6}{7}=\frac{24}{35}$
[c] $\frac{5}{6}\times\frac{5}{7}=\frac{25}{42}$ [d] $\frac{3}{5}\times\frac{3}{8}=\frac{9}{40}$
[e] $\frac{5}{9}\times\frac{2}{3}=\frac{10}{27}$ [f] $\frac{2}{9}\times\frac{5}{7}=\frac{10}{63}$
[g] $\frac{6}{11}\times\frac{4}{5}=\frac{24}{55}$ [h] $\frac{11}{12}\times\frac{5}{7}=\frac{55}{84}$

2 [a] $\frac{1}{8}\times\frac{2}{3}=\frac{1}{12}$ [b] $\frac{2}{9}\times\frac{3}{8}=\frac{1}{12}$
[c] $\frac{2}{9}\times\frac{3}{14}=\frac{1}{21}$ [d] $\frac{1}{2}\times\frac{4}{5}=\frac{2}{5}$
[e] $\frac{2}{5}\times\frac{1}{4}=\frac{1}{10}$ [f] $\frac{3}{4}\times\frac{8}{9}=\frac{2}{3}$
[g] $\frac{3}{4}\times\frac{20}{27}=\frac{5}{9}$ [h] $\frac{4}{9}\times\frac{3}{16}=\frac{1}{12}$

3 [a] $\frac{3}{5}\times 15=\frac{3}{5}\times\frac{15}{1}=9$
[b] $4\times\frac{1}{4}=\frac{4}{1}\times\frac{1}{4}=1$
[c] $\frac{2}{7}\times 21=\frac{2}{7}\times\frac{21}{1}=6$
[d] $\frac{5}{6}\times 24=\frac{5}{6}\times\frac{24}{1}=20$
[e] $9\times\frac{5}{6}=\frac{9}{1}\times\frac{5}{6}=\frac{15}{2}=7\frac{1}{2}$
[f] $\frac{1}{3}\times 5=\frac{1}{3}\times\frac{5}{1}=\frac{5}{3}=1\frac{2}{3}$

4 [a] $\frac{2}{5}\times 5\frac{1}{2}=\frac{2}{5}\times\frac{11}{2}=\frac{11}{5}=2\frac{1}{5}$
[b] $1\frac{2}{3}\times\frac{3}{10}=\frac{5}{3}\times\frac{3}{10}=\frac{1}{2}$
[c] $7\frac{1}{2}\times\frac{2}{15}=\frac{15}{2}\times\frac{2}{15}=1$
[d] $8\frac{3}{4}\times\frac{2}{7}=\frac{35}{4}\times\frac{2}{7}=\frac{5}{2}=2\frac{1}{2}$
[e] $\frac{4}{5}\times 12\frac{1}{2}=\frac{4}{5}\times\frac{25}{2}=10$
[f] $\frac{3}{4}\times 8\frac{2}{3}=\frac{3}{4}\times\frac{26}{3}=\frac{13}{2}=6\frac{1}{2}$
[g] $2\frac{2}{3}\times 6=\frac{8}{3}\times\frac{6}{1}=16$
[h] $4\frac{5}{6}\times 8=\frac{29}{6}\times\frac{8}{1}=\frac{116}{3}=38\frac{2}{3}$
[i] $3\frac{1}{2}\times 2\frac{2}{7}=\frac{7}{2}\times\frac{16}{7}=8$
[j] $5\frac{1}{3}\times 3\frac{3}{8}=\frac{16}{3}\times\frac{27}{8}=18$
[k] $2\frac{1}{2}\times 1\frac{1}{10}=\frac{5}{2}\times\frac{11}{10}=\frac{11}{4}=2\frac{3}{4}$

[l] $3\frac{1}{2}\times1\frac{2}{6}=\frac{7}{2}\times\frac{8}{6}=\frac{28}{6}=\frac{14}{3}=4\frac{2}{3}$

[m] $5\frac{1}{2}\times1\frac{4}{11}=\frac{11}{2}\times\frac{15}{11}=\frac{15}{2}=7\frac{1}{2}$

[n] $3\frac{2}{5}\times4\frac{1}{2}=\frac{17}{5}\times\frac{9}{2}=\frac{153}{10}=15\frac{3}{10}$

5 [a] $0.25\times\frac{4}{5}=\frac{25}{100}\times\frac{4}{5}=\frac{1}{4}\times\frac{4}{5}=\frac{1}{5}$

[b] $\frac{4}{20}\times0.8=\frac{4}{20}\times\frac{8}{10}=\frac{4}{20}\times\frac{4}{5}=\frac{4}{25}$

[c] $\frac{3}{5}\times1.5=\frac{3}{5}\times\frac{15}{10}=\frac{3}{5}\times\frac{3}{2}=\frac{9}{10}$

[d] $0.6\times2\frac{1}{2}=\frac{8}{10}\times\frac{5}{2}=\frac{3}{8}\times\frac{8}{2}=\frac{3}{2}=1\frac{1}{2}$

6 [a] $\frac{3}{8}\times\frac{15}{16}\times\frac{8}{9}=\frac{1}{2}$

[b] $\frac{5}{6}\times\frac{2}{7}\times\frac{21}{35}=\frac{1}{7}$

[c] $\frac{1}{25}\times50\times0.25=\frac{1}{25}\times\frac{50}{1}\times\frac{25}{100}=\frac{1}{2}$

[d] $0.6\times20\times\frac{2}{5}=\frac{6}{10}\times\frac{20}{1}\times\frac{2}{5}=\frac{24}{5}=4\frac{4}{5}$

7 [a] $\frac{1}{3}$ of $\frac{2}{3}=\frac{1}{3}\times\frac{2}{3}=\frac{2}{9}$

[b] $\frac{2}{3}$ of $\frac{3}{5}=\frac{2}{3}\times\frac{3}{5}=\frac{2}{5}$

[c] $\frac{4}{5}$ of $25=\frac{4}{5}\times\frac{25}{1}=20$

8 [a] $\frac{1}{2}$ [b] 12 [c] $1\frac{1}{3}$
[d] $8\frac{3}{4}$ [e] $\frac{1}{2}$ [f] $\frac{1}{15}$
[g] $1\frac{3}{4}$

9 [a] 45 [b] 75 [c] 800
[d] 25 [e] 40 [f] 400
[g] 33 [h] 30 [i] 325
[j] 584

10 [a] = [b] < [c] =
[d] > [e] < [f] >
[g] > [h] < [i] =
[j] < [k] > [l] >
[m] > [n] =

11 [a] 7 [b] 7 [c] $\frac{2}{3}$
[d] $\frac{5}{7}$ [e] $\frac{5}{3}$ [f] $\frac{5}{6}$
[g] 2 [h] 4

12 The width $=\frac{2}{5}\times20=\frac{2}{5}\times\frac{20}{1}=8$ cm.
The area $=20\times8=160$ cm^2

13 The number of feddans $=\frac{5}{6}\times\frac{30}{1}$
$=25$ feddans.

14 The water she needs $=1\frac{3}{4}\times4\frac{1}{2}$
$=\frac{7}{4}\times\frac{9}{2}=\frac{63}{8}=7\frac{7}{8}$ cups of water

15 The number of boys $=\frac{2}{3}\times30=20$ boys.
The number of boys have blue eyes
$=\frac{1}{5}\times20=4$ boys.
The number of boys do not have blue eyes
$=20-4=16$ boys.

16 The price of meat $=60\times8\frac{3}{4}=\frac{60}{1}\times\frac{35}{4}$
= L.E. 525
The left money with her = 600 – 525 = L.E. 75

17 The age of Sami $=\frac{1}{3}\times\frac{48}{1}=16$ years.
The age of Farid $=\frac{1}{4}\times\frac{16}{1}=4$ years.

18 [a] 3 [b] 5

Test on the first part of unit one

1 (1) $\frac{3}{14}$ (2) 3.13
(3) $\frac{4}{5}$ (4) =
(5) 0.01 (6) >
(7) 28 (8) 13.96
(9) 4.599 (10) 1
(11) > (12) 1765
(13) 3 (14) 4

2 (15) $49.554\simeq49.55$ (16) 3.88
(17) $6.6776\simeq6.678$ (18) 35
(19) $5\frac{3}{5}$ (20) 3.97
(21) 45900 (22) 10

3 (23) The decimal fraction is 0.1347
• $0.1347\simeq0.13$ (to the nearest $\frac{1}{100}$)
• $0.1347\simeq0.135$ (to the nearest $\frac{1}{1000}$)
(24) The order is : $\frac{1}{4}$, $\frac{3}{5}$, $\frac{7}{8}$ and 1
(25) The area $=16.25\times10=162.5\simeq163$ m^2
(26) The cost $=16.55\times2.7=44.685$
$\simeq45$ pounds.

Exercise 6

1 [a] $\frac{2}{5}\div\frac{3}{5}=\frac{2}{5}\times\frac{5}{3}=\frac{2}{3}$

[b] $\frac{2}{3}\div\frac{1}{6}=\frac{2}{3}\times\frac{6}{1}=\frac{4}{1}=4$

[c] $\frac{4}{5}\div\frac{1}{2}=\frac{4}{5}\times\frac{2}{1}=\frac{8}{5}=1\frac{3}{5}$

[d] $\frac{2}{3}\div\frac{3}{7}=\frac{2}{3}\times\frac{7}{3}=\frac{14}{9}=1\frac{5}{9}$

[e] $\frac{3}{8}\div\frac{3}{4}=\frac{3}{8}\times\frac{4}{3}=\frac{1}{2}$

[f] $\frac{7}{9}\div\frac{7}{12}=\frac{7}{9}\times\frac{12}{7}=\frac{4}{3}=1\frac{1}{3}$

[g] $\frac{2}{7}\div\frac{5}{7}=\frac{2}{7}\times\frac{7}{5}=\frac{2}{5}$

[h] $\frac{4}{10}\div\frac{6}{10}=\frac{4}{10}\times\frac{10}{6}=\frac{2}{3}$

[i] $\frac{6}{7}\div\frac{8}{21}=\frac{6}{7}\times\frac{21}{8}=\frac{9}{4}=2\frac{1}{4}$

[j] $\frac{1}{2}\div\frac{1}{12}=\frac{1}{2}\times\frac{12}{1}=\frac{6}{1}=6$

[k] $\frac{5}{6}\div\frac{25}{36}=\frac{5}{6}\times\frac{36}{25}=\frac{6}{5}=1\frac{1}{5}$

[l] $\frac{9}{10}\div\frac{3}{10}=\frac{9}{10}\times\frac{10}{3}=\frac{3}{1}=3$

[m] $\frac{4}{3}\div\frac{2}{9}=\frac{4}{3}\times\frac{9}{2}=\frac{6}{1}=6$

[n] $\frac{1}{2}\div\frac{3}{10}=\frac{1}{2}\times\frac{10}{3}=\frac{5}{3}=1\frac{2}{3}$

[o] $\frac{3}{4}\div0.25=\frac{3}{4}\div\frac{1}{4}=\frac{3}{4}\times\frac{4}{1}=\frac{3}{1}=3$

2 [a] $6\div\frac{1}{3}=\frac{6}{1}\times\frac{3}{1}=18$

[b] $12\div\frac{3}{4}=\frac{12}{1}\times\frac{4}{3}=16$

[c] $10\div\frac{5}{7}=\frac{10}{1}\times\frac{7}{5}=14$

[d] $45\div\frac{9}{10}=\frac{45}{1}\times\frac{10}{9}=50$

[e] $11\div\frac{11}{7}=\frac{11}{1}\times\frac{7}{11}=7$

[f] $63\div\frac{7}{8}=\frac{63}{1}\times\frac{8}{7}=72$

[g] $\frac{1}{4}\div2=\frac{1}{4}\times\frac{1}{2}=\frac{1}{8}$

[h] $\frac{3}{5}\div6=\frac{3}{5}\times\frac{1}{6}=\frac{1}{10}$

[i] $\frac{6}{7}\div18=\frac{6}{7}\times\frac{1}{18}=\frac{1}{21}$

[j] $\frac{7}{8}\div21=\frac{7}{8}\times\frac{1}{21}=\frac{1}{24}$

[k] $\frac{9}{10}\div3=\frac{9}{10}\times\frac{1}{3}=\frac{3}{10}$

[l] $5\div\frac{10}{11}=\frac{5}{1}\times\frac{11}{10}=\frac{11}{2}=5\frac{1}{2}$

3 [a] $6\div1\frac{1}{2}=\frac{6}{1}\div\frac{3}{2}=\frac{6}{1}\times\frac{2}{3}=4$

[b] $8\div1\frac{3}{5}=\frac{8}{1}\div\frac{8}{5}=\frac{8}{1}\times\frac{5}{8}=5$

[c] $10\div3\frac{1}{5}=\frac{10}{1}\div\frac{16}{5}=\frac{10}{1}\times\frac{5}{16}=\frac{25}{8}=3\frac{1}{8}$

[d] $4\frac{2}{3}\div7=\frac{14}{3}\div\frac{7}{1}=\frac{14}{3}\times\frac{1}{7}=\frac{2}{3}$

[e] $2\frac{2}{5}\div24=\frac{12}{5}\div\frac{24}{1}=\frac{12}{5}\times\frac{1}{24}=\frac{1}{10}$

[f] $13\frac{1}{3}\div8=\frac{40}{3}\div\frac{8}{1}=\frac{40}{3}\times\frac{1}{8}=\frac{5}{3}=1\frac{2}{3}$

[g] $\frac{2}{3}\div6\frac{2}{3}=\frac{2}{3}\div\frac{20}{3}=\frac{2}{3}\times\frac{3}{20}=\frac{1}{10}$

[h] $\frac{3}{4}\div7\frac{1}{2}=\frac{3}{4}\div\frac{15}{2}=\frac{3}{4}\times\frac{2}{15}=\frac{1}{10}$

[i] $4\frac{1}{2}\div\frac{1}{2}=\frac{9}{2}\div\frac{1}{2}=\frac{9}{2}\times\frac{2}{1}=9$

[j] $6\frac{2}{3}\div\frac{5}{6}=\frac{20}{3}\div\frac{5}{6}=\frac{20}{3}\times\frac{6}{5}=8$

[k] $3\frac{3}{4}\div7\frac{1}{2}=\frac{15}{4}\div\frac{15}{2}=\frac{15}{4}\times\frac{2}{15}=\frac{1}{2}$

[l] $1\frac{1}{2} \div 3\frac{3}{4} = \frac{3}{2} \div \frac{15}{4} = \frac{3}{2} \times \frac{4}{15} = \frac{2}{5}$

[m] $5\frac{1}{2} \div 3\frac{2}{3} = \frac{11}{2} \div \frac{11}{3} = \frac{11}{2} \times \frac{3}{11} = \frac{3}{2} = 1\frac{1}{2}$

[n] $4\frac{1}{6} \div 1\frac{2}{3} = \frac{25}{6} \div \frac{5}{3} = \frac{25}{6} \times \frac{3}{5} = \frac{5}{2} = 2\frac{1}{2}$

[o] $1\frac{2}{5} \div 5\frac{5}{7} = \frac{7}{5} \div \frac{40}{7} = \frac{7}{5} \times \frac{7}{40} = \frac{49}{200}$

4 [a] $\left(\frac{3}{7} \div \frac{6}{10}\right) \div \frac{4}{7} = \frac{3}{7} \times \frac{10}{6} \times \frac{7}{4} = \frac{5}{4} = 1\frac{1}{4}$

[b] $\left(3\frac{1}{2} \times 2\frac{1}{2}\right) \div \frac{35}{4} = \left(\frac{7}{2} \times \frac{5}{2}\right) \div \frac{35}{4} = \frac{35}{4} \times \frac{4}{35} = 1$

[c] $\left(\frac{5}{16} \div \frac{3}{8}\right) \times \frac{4}{5} = \frac{5}{16} \times \frac{8}{3} \times \frac{4}{5} = \frac{2}{3}$

[d] $\left(3 + \frac{9}{9}\right) \div 3\frac{1}{5} = (3 + 1) \div \frac{16}{5} = \frac{4}{1} \div \frac{16}{5} = \frac{4}{1} \times \frac{5}{16} = \frac{5}{4} = 1\frac{1}{4}$

[e] $\left(\frac{3}{2} - \frac{1}{2}\right) \div \frac{5}{8} = \frac{2}{2} \div \frac{5}{8} = 1 \div \frac{5}{8} = 1 \times \frac{8}{5} = \frac{8}{5} = 1\frac{3}{5}$

[f] $\left(1 \div \frac{1}{5}\right) - 2\frac{1}{2} = \left(1 \times \frac{5}{1}\right) - \frac{5}{2} = 5 - \frac{5}{2} = \frac{10}{2} - \frac{5}{2} = \frac{5}{2} = 2\frac{1}{2}$

5 [a] > [b] > [c] = [d] =
[e] = [f] < [g] = [h] =
[i] > [j] < [k] < [l] <

6 [a] $\frac{5}{3}$ [b] $\frac{8}{7}$ [c] $\frac{5}{6}$ [d] $5\frac{3}{4}$
[e] $5\frac{3}{5}$ [f] $8\frac{4}{7}$ [g] $1\frac{2}{3}$ [h] $2\frac{1}{2}$
[i] $\frac{2}{3}$ [j] 7

7 The price of each pen
$= 10\frac{1}{2} \div 14 = \frac{21}{2} \times \frac{1}{14} =$ L.E. $\frac{3}{4}$

8 The length of each piece
$= 13\frac{1}{3} \div 4 = \frac{40}{3} \times \frac{1}{4} = \frac{10}{3} = 3\frac{1}{3}$ m.

9 Number of quarters $= 10\frac{1}{2} \div \frac{1}{4} = \frac{21}{2} \times \frac{4}{1}$ = 42 quarters.

10 There are $= 2\frac{1}{2} \div \frac{1}{6} = \frac{5}{2} \div \frac{1}{6} = \frac{5}{2} \times \frac{6}{1} = 15$

11 There are $= 7\frac{1}{2} \div \frac{3}{4} = \frac{15}{2} \div \frac{3}{4} = \frac{15}{2} \times \frac{4}{3} = 10$

12 Number of kg. $= 31\frac{1}{2} \div 4\frac{1}{2} = \frac{63}{2} \div \frac{9}{2} = \frac{63}{2} \times \frac{2}{9} = 7$ kg.

13 Number of metres $= 22 \div 2\frac{3}{4} = 22 \div \frac{11}{4} = 22 \times \frac{4}{11} = 8$ m.

14 Number of farmers $= 92\frac{1}{2} \div 4\frac{5}{8} = \frac{185}{2} \div \frac{37}{8} = \frac{185}{2} \times \frac{8}{37} = 20$ farmers.

15 The side length $= \frac{6}{11} \div 4 = \frac{6}{11} \times \frac{1}{4} = \frac{3}{22}$ m.

16 [a] 10 [b] 16

Exercise 7

1 [a] 6.443 [b] 4.005 [c] 0.3257
[d] 70.02 [e] 53.71 [f] 4.5678
[g] 0.96 [h] 0.06243 [i] 0.6591
[j] 0.683 [k] 0.0044 [l] 0.02
[m] 0.38725 [n] 0.0036 [o] 0.04921
[p] 0.0005 [q] 0.000093 [r] 0.00482

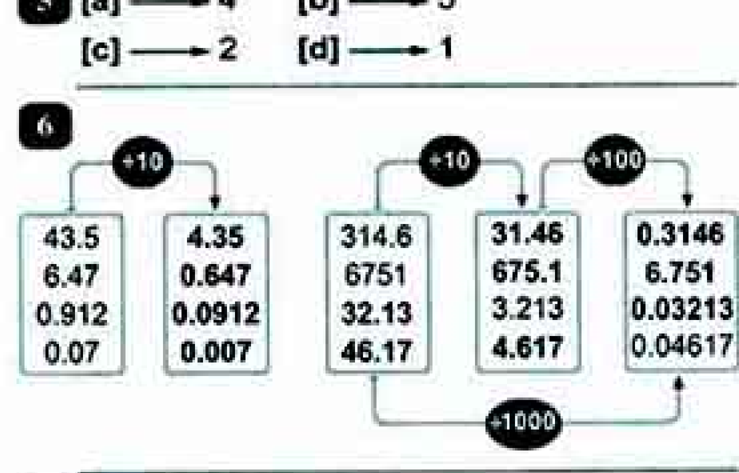
2 [a] 0.0375 [b] 0.17 [c] 0.000398
[d] 5.7434 [e] 0.753 [f] 0.00876

3 [a] ✗ [b] ✓ [c] ✗
[d] ✓ [e] ✗ [f] ✗
[g] ✓

4 [a] > [b] < [c] =
[d] > [e] = [f] <
[g] = [h] > [i] >
[j] <

5 [a] → 4 [b] → 3
[c] → 2 [d] → 1

6



7 [a] 10 [b] 100 [c] 100
[d] 1000 [e] 1000 [f] 100
[g] 10000 [h] 173.5 [i] 459.9
[j] 0.2 [k] 5590 [l] 720
[m] 2720 [n] 2

8 [a] 74.3 [b] 3.237 [c] 0.0007
[d] 0.8 [e] 0.072 [f] 1.587
[g] 0.0192 [h] 0.325 [i] 5.615
[j] 0.054 [k] 0.4195 [l] 0.734

9 [a] 2.64
[b] 0.2765 ≃ 0.3
[c] 69.5745 ≃ 69.575
[d] 5.69 + 9.5 = 15.19
[e] 92.92 – 8.75 = 84.17
[f] 0.0016 ≃ 0.002
[g] 0.0123 + 0.0861 = 0.0984 ≃ 0.1

10 [a] 2.5989 , 0.25989 , 0.025989
[b] 0.03 , 0.003 , 0.0003

11 The price of one kg. = 47.5 ÷ 10 = L.E. 4.75

12 The amount of gasoline = 534.8 ÷ 10 = 53.48 litres.

13 It covered in one second = 45.8 ÷ 10 = 4.58 m.

14 Each poor man took = 345.6 ÷ 100 = 3.456 m.

15 The price of each computer = 2 349 650 ÷ 1000 = L.E. 2349.65

16 The price of 1kg. of orange = 4750 ÷ 1000 = L.E. 4.75
The price of 1kg. of apple = 1495 ÷ 100 = L.E. 14.95

17 [a] 0.6 ÷ 20 = 0.6 ÷ 2 ÷ 10 = **0.3** ÷ 10 = **0.03**
[b] 0.09 ÷ 30 = 0.09 ÷ 3 ÷ 10 = **0.03** ÷ 10 = **0.003**
[c] 500.5 ÷ 500 = 500.5 ÷ **5** ÷ 100 = **100.1** ÷ 100 = **1.001**

Exercise 8

1 [a] 43 [b] 28 [c] 17
[d] 26 [e] 39 [f] 11
[g] 205 [h] 210 [i] 143
[j] 93 [k] 77 [l] 53
[m] 360 [n] 601

2 [a] 36 [b] 124 [c] 54
[d] 211 [e] 52 [f] 292
[g] 160

3 The number = 2925 ÷ 117 = 25

4 The other number = 9088 ÷ 284 = 32

5 The number of months = 26555 ÷ 235 = 113 months.

6 The number of months = 16176 ÷ 337 = 48 months.
The number of years = 48 ÷ 12 = 4 years.

7 The weight of each pack = 5904 ÷ 492 = 12 kg.

8 The number of years = 53655 ÷ 365 = 147 years.

9 The number of trips = 54060 ÷ 265 = 204 trips.

10 The price of each box = 2975 ÷ 119 = L.E. 25
The price of each kg. = 25 ÷ 5 = L.E. 5

11 [a] 369 [b] 248
[c] 368 [d] 370

Exercise 9

1 [a] 42 ÷ 7 = 6 [b] 36 ÷ 4 = 9
[c] 8 ÷ 2 = 4 [d] 28 ÷ 4 = 7
[e] 75 ÷ 25 = 3 [f] 272 ÷ 8 = 34

2 [a] $\frac{72.36 \times 100}{0.18 \times 100} = \frac{7236}{18} = 402$
[b] $\frac{76.5 \times 100}{7.65 \times 100} = \frac{7650}{765} = 10$
[c] $\frac{55.33 \times 100}{0.11 \times 100} = \frac{5533}{11} = 503$
[d] $\frac{2.16 \times 10}{7.2 \times 10} = \frac{21.6}{72} = 0.3$
[e] $\frac{94.5 \times 10}{3.5 \times 10} = \frac{945}{35} = 27$
[f] $\frac{30.24 \times 10}{3.6 \times 10} = \frac{302.4}{36} = 8.4$

3 [a] $0.8 \div 0.2 = \frac{0.8 \times 10}{0.2 \times 10} = \frac{8}{2} = 4$
[b] $36.18 \div 0.09 = \frac{36.18 \times 100}{0.09 \times 100} = \frac{3618}{9} = 402$
[c] $0.75 \div 0.15 = \frac{0.75 \times 100}{0.15 \times 100} = \frac{75}{15} = 5$
[d] $4.2 \div 0.06 = \frac{4.2 \times 100}{0.06 \times 100} = \frac{420}{6} = 70$
[e] $2.64 \div 0.2 = \frac{2.64 \times 10}{0.2 \times 10} = \frac{26.4}{2} = 13.2$
[f] $4.86 \div 0.9 = \frac{4.86 \times 10}{0.9 \times 10} = \frac{48.6}{9} = 5.4$
[g] $9.2 \div 2.5 = \frac{9.2 \times 10}{2.5 \times 10} = \frac{92}{25} = 3.68$
[h] $1.32 \div 1.1 = \frac{1.32 \times 10}{1.1 \times 10} = \frac{13.2}{11} = 1.2$
[i] $9.6 \div 0.32 = \frac{9.6 \times 100}{0.32 \times 100} = \frac{960}{32} = 30$
[j] $48.48 \div 4.8 = \frac{48.48 \times 10}{4.8 \times 10} = \frac{484.8}{48} = 10.1$
[k] $2.67 \div 1.2 = \frac{2.67 \times 10}{1.2 \times 10} = \frac{26.7}{12} = 2.225$
[l] $4.384 \div 0.32 = \frac{4.384 \times 100}{0.32 \times 100} = \frac{438.4}{32} = 13.7$
[m] $0.1932 \div 0.92 = \frac{0.1932 \times 100}{0.92 \times 100} = \frac{19.32}{92} = 0.21$
[n] $1.155 \div 0.35 = \frac{1.155 \times 100}{0.35 \times 100} = \frac{115.5}{35} = 3.3$
[o] $357 \div 0.7 = \frac{357 \times 10}{0.7 \times 10} = \frac{3570}{7} = 510$
[p] $30.75 \div 4.1 = \frac{30.75 \times 10}{4.1 \times 10} = \frac{307.5}{41} = 7.5$
[q] $94.5 \div 3.5 = \frac{94.5 \times 10}{3.5 \times 10} = \frac{945}{35} = 27$
[r] $114.45 \div 1.09 = \frac{114.45 \times 100}{1.09 \times 100} = \frac{11445}{109} = 105$
[s] $3.375 \div 13.5 = \frac{3.375 \times 10}{13.5 \times 10} = \frac{33.75}{135} = 0.25$
[t] $77.728 \div 6.94 = \frac{77.728 \times 100}{6.94 \times 100} = \frac{7772.8}{694} = 11.2$
[u] $21.528 \div 93.6 = \frac{21.528 \times 10}{93.6 \times 10} = \frac{215.28}{936} = 0.23$
[v] $32.24 \div 12.4 = \frac{32.24 \times 10}{12.4 \times 10} = \frac{322.4}{124} = 2.6$
[w] $16.112 \div 1.52 = \frac{16.112 \times 100}{1.52 \times 100} = \frac{1611.2}{152} = 10.6$
[x] $17.8932 \div 0.37 = \frac{17.8932 \times 100}{0.37 \times 100}$
$= \frac{1789.32}{37} = 48.36$

4 [a] ✗ [b] ✓ [c] ✓
[d] ✗ [e] ✓ [f] ✗

5 [a] < [b] < [c] > [d] =
[e] = [f] > [g] < [h] >

6 [a] 40.2 [b] 10 [c] 30
[d] 1040.2 [e] 60.5 [f] 2.9
[g] 0.24

7 [a] 62.5 ÷ 6.25 = 6250 ÷ 625 = 10
[b] 0.48 ÷ 0.6 = 4.8 ÷ 6 = 0.8
[c] 0.425 ÷ 0.85 = 42.5 ÷ 85 = 0.5
[d] 3.5 ÷ 0.5 = 35 ÷ 5 = 7
[e] 2.125 ÷ 0.125 = 2125 ÷ 125 = 17
[f] 8.4 ÷ 2.1 = 84 ÷ 21 = 4
[g] 10.75 ÷ 1.25 = 1075 ÷ 125 = 8.6
[h] 2.12 ÷ 0.016 = 2120 ÷ 16 = 132.5
[i] 9.568 ÷ 9.2 = 95.68 ÷ 92 = 1.04

8 [a] 71 [b] 320 [c] 39.25
[d] 1818.9 [e] 4650.078 [f] 10
[g] 0.46 [h] 29.38 [i] 26.4
[j] 1.92

9 [a] 0.495 [b] 0.5 [c] 0.5 [d] 2.45

10 The number = 75.52 ÷ 0.64 = 118

11 The divisor = 7.049 ÷ 0.07 = 100.7

12 375 ÷ 0.5 = 750
$750 + 5\frac{1}{4} = 750 + 5.25 = 755.25$

13 [a] Since : 8.018 ≃ 8 , 0.19 ≃ 0.2
, then the estimate of the quotient
is 8 ÷ 0.2 = 40
The estimation is acceptable.
[b] Since : 6.235 ≃ 6 , 0.58 ≃ 0.6
, then the estimate of the quotient
is 6 ÷ 0.6 = 10
The estimation is acceptable.
[c] Since : 0.1932 ≃ 0.2 , 0.92 ≃ 1
, then the estimate of the quotient
is 0.2 ÷ 1 = 0.2
The estimation is acceptable.
[d] Since : 77.428 ≃ 77 , 6.94 ≃ 7
, then the estimate of the quotient
is 77 ÷ 7 = 11
The estimation is acceptable.

14 [a] 28 [b] 15

15 The number of parts = 53.55 ÷ 3.15 = 17 parts.

16 The distance that the train covers in one hour = 221.65 ÷ 2.75 = 80.6 km.

17 The number of the excellent pupils
= 362.5 ÷ 14.5 = 25 pupils.

18 The number of floors = 42.75 ÷ 2.85
= 15 floors.

19 The height of the paper = 4.5 × 10 = 45 mm.
The number of papers = 45 ÷ 0.090
= 500 papers.

20 The width = 10.25 ÷ 4.1 = 2.5 m.
The perimeter = (4.1 + 2.5) × 2 = 13.2 m.

21 The price of butter = 4.375 × 10.3
= L.E. 45.0625
The price of cheese = 150.25 − 45.0625
= L.E. 105.1875
The price of one kg. of cheese
= 105.1875 ÷ 12.75 = L.E. 8.25

22 [a] 640 [b] 6.4
[c] 4300 [d] 0.00064

23 [a] 46 [b] 5.7 [c] 46
[d] 570 [e] 460 [f] 5.7

24 [a] 960 [b] 430

Exercise 10

1 [a] 0.4 [b] 0.16 [c] 0.375
[d] 0.088 [e] 0.175 [f] 48.5
[g] 0.25 [h] 0.16

2 [a] 0.33 [b] 0.17 [c] 0.67
[d] 0.08 [e] 0.45 [f] 0.57

3 [a] 2.3 [b] 0.56 [c] 0.27
[d] 1.3 [e] 0.846 [f] 0.14

4 [a] 0.3 [b] 0.1 [c] 1.1
[d] 0.1 [e] 0.2 [f] 25
[g] 10.3 [h] 25.4 [i] 25.1
[j] 10.7 [k] 24.1 [l] 176.7

5 [a] 16.43 [b] 1.45 [c] 4.14
[d] 13.03 [e] 18.13 [f] 15.41

6 [a] $8.5 \div 2.7 = \frac{8.5 \times 10}{2.7 \times 10} = \frac{85}{27} \simeq 3.1$
[b] $1300.29 \div 52.8 = \frac{1300.29 \times 10}{52.8 \times 10}$
$= \frac{13002.9}{528} \simeq 24.63$
[c] $28.448 \div 1.2 = \frac{28.448 \times 10}{1.2 \times 10}$
$= \frac{284.48}{12} \simeq 23.7$
[d] $458.62 \div 35.2 = \frac{458.62 \times 10}{35.2 \times 10}$
$= \frac{4586.2}{352} \simeq 13.029$

[e] $251.76 \div 38\frac{1}{4} = \frac{251.76 \times 100}{38.25 \times 100}$

$= \frac{25176}{3825} = 6.582$

7 [a] $(3.425 + 1.07) \div 2.8 = 4.495 \div 2.8$

$= \frac{4.495 \times 10}{2.8 \times 10}$

$= \frac{44.95}{28} = 1.61$

[b] $7.52 \div (14.73 - 11.58) = 7.52 \div 3.15$

$= \frac{7.52 \times 100}{3.15 \times 100}$

$= \frac{752}{315} \simeq 2.39$

8 [a] 6 [b] 11 [c] 6 [d] 6

9 [a] 6 [b] 5 [c] = [d] >

10 The length of the rectangle = 9.43 ÷ 2.45

≃ 3.85 cm.

11 The share of each son = 1256987 ÷ 8

≃ L.E. 157123

12 The rest = 125000 − 31250 = L.E. 93750

The value of each instalment = 93750 ÷ 144

≃ L.E. 651

13 [a] $0.\dot{7}$ [b] $0.\dot{6}$

Test on the second part of unit one

1
(1) 2 (2) 0.0786
(3) 7 (4) 92
(5) 6 (6) 443.9
(7) $\frac{5}{8}$ (8) 4.478
(9) 0.75 (10) 10
(11) 0.3 (12) 23
(13) 2.36 (14) 4

2
(15) 2.67 (16) 43
(17) $\frac{13}{18}$ (18) $\frac{5}{6}$
(19) 250 (20) 2
(21) 6 (22) 6.6

3
(23) The other number = 17604 ÷ 326 = 54

(24) The distance = 1074.9 ÷ 10

= 107.49 km.

(25) The number of bottles = 236.25 ÷ 0.75

= 315 bottles.

(26) The number of thirds = $5 \div \frac{1}{3}$

= 5 × 3 = 15 thirds.

Unit Two

Exercise 11

1
[a] orange , apple and banana.
[b] donkey , tiger , camel and dog.
[c] train , car , bus and airplane.
[d] Samir , Soha and Ahmed.
[e] duck , sparrow and hen.
[f] football , tennis ball , basketball and volleyball.

2
[a] a set
[b] not a set , because we cannot determine in an exact manner which city is beautiful and which is not.
[c] not a set , because we cannot determine in exact manner which story is beautiful and which is not.
[d] a set [e] a set
[f] not a set , because we cannot determine in an exact manner if the pupil is intelligent or not.
[g] a set [h] a set [i] a set
[j] a set [k] a set [l] a set
[m] not a set , because we cannot determine them.
[n] a set [o] a set [p] a set [q] a set
[r] not a set , because we do not know the players.
[s] not a set , because we cannot determine in an exact manner if the students is short or tall.
[t] not a set , because we cannot determine in an exact manner if the people are clever or not.
[u] a set [v] a set [w] a set
[x] not a set , because we cannot determine in an exact manner if some manners are good or bad.

3
[a] 3 , 0 , 7 and 2 [b] e , l , m , n and t
[c] red , white and black
[d] East , West , North and South

[e] 6 and 8 [f] 1 , 3 , 5 , 7 and 9
[g] 6 , 7 , 8 , 9 , 10 , 11 , 12 , 13 and 14
[h] Saturday , Sunday , Monday , Tuesday , Wednesday , Thursday and Friday
[i] February [j] April and August
[k] 19 , 29 , 39 , 49 , 59 , 69 , 79 , 89 and 99
[l] 11 , 22 , 33 , 44 , 55 , 66 , 77 , 88 and 99
[m] 111 , 222 , 333 , 444 , 555 , 666 , 777 , 888 and 999
[n] January , February , March , April , May , June , July , August , September , October , November and December.
[o] Muharram , Safar , Rabia first , Rabia Second , Jumada first , Jumada second , Rajab , Shaban , Ramadan , Shawwal , Zu'lqida , Zu'ihijjah.
[p] 2 and 3
[q] 1 , 2 , 3 , 4 , 6 and 12

Exercise 12

1
[a] A = {3 , 5 , 0 , 1}
[b] B = {a , d , r , e , s}
[c] C = {Saturday , Sunday , Monday , Tuesday , Wednesday , Thursday , Friday}
[d] D = {June , July , January}
[e] E = {East , West , North , South}
[f] F = {Nile}
[g] G = {1 , 2 , 3 , 4 , 5 , 6}
[h] H = {A , B , C , D , E}
[i] I = {9}
[j] J = {5 , 7 , 11 , 13}
[k] K = {3 , 5 , 7 , 9}
[l] L = {8 , 10 , 12 , ...}
[m] M = {11 , 22 , 33 , 44 , 55 , 66 , 77 , 88 , 99}

2
[a] A = The set of letters of the word "Zienab"
[b] B = The set of letters of the word "Ali"
[c] X = The set of even numbers which are between 1 and 9
[d] Z = The set of prime numbers which are between 1 and 8
[e] Y = The set of multiples of 5 which are between 4 and 16

[f] G = The set of prime numbers which are between 1 and 12

[g] H = The set of even numbers which are between 15 and 21

[h] C = The set of seasons of the year.

[i] E = The set of even numbers which are between 5 and 7

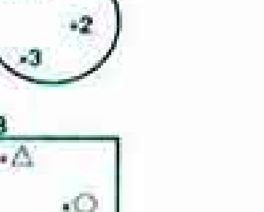
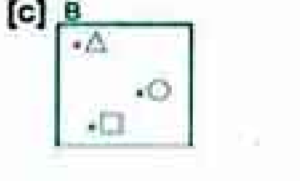
[j] F = The set of months of the Christian year which begins with "F"

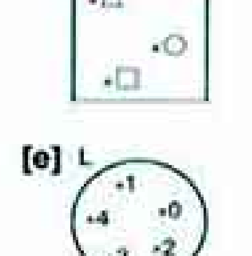
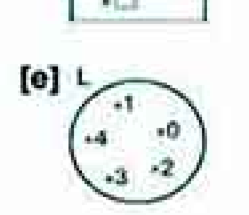
3

	The Listing Method	The Description Method
[a]	{c , a , r}	The set of the letters forming the word car
[b]	{East , West , North , South}	The set of the original directions.
[c]	{red , white , black}	The set of the colors forming Egypt's flag
[d]	{4 , 6 , 2 , 1}	The set of the digits in the number 46421.
[e]	{Abo Bakr , Omar , Othman , Ali}	The set of orthodox caliphs
[f]	{s , e , r , i}	The set of the letters of the word (Series)
[g]	{2 , 4 , 6 , 8 , 10}	The set of even numbers which are between 1 and 11

4

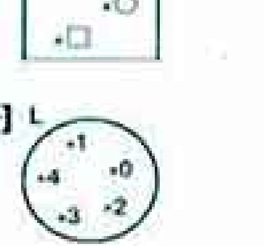
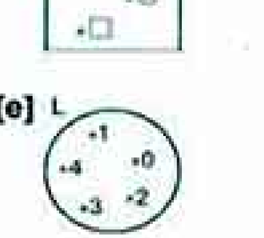
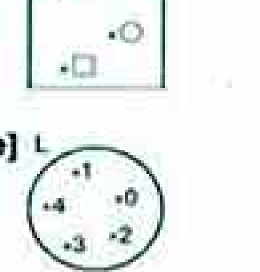
[a] [b] [c] [d] [e] [f] [g]

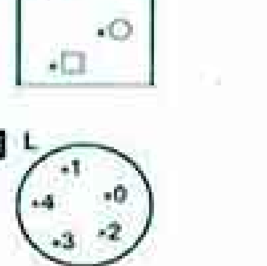



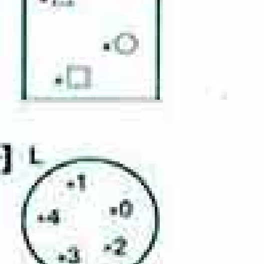



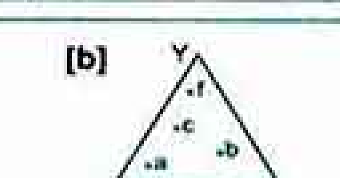
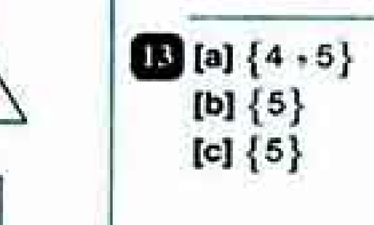








5 [a] {△ , ○ , ▱}

[b] (1) {2 , 4 , 6 , 8}

(2) the set of multiples of 2 which are between 1 and 9

"There are other solutions"

6 A = {0 , 1 , 2 , 3 , 5 , 6 , 9}

B = {1 , 2 , 3 , 4 , 5 , 6 , 7 , 8}

7 X = {1 , 4 , 5 , 7 , 8}

Y = {0 , 1 , 3 , 6 , 8} , {8 , 1}

8 [a] R = {a , b , c , e , g , h}

[b] Q = {b , e , g}   [c] {a , c , h}

[d] Z = ∅ , Z is an empty set.

9 [a] A = {0 , 1 , 2 , 3 , 6 , 9}

[b] B = {1 , 3 , 4 , 6 , 7 , 8}

[c] C = {2 , 3 , 4 , 5 , 6}

[d] {1 , 3 , 6}   [e] {3 , 4 , 6}

[f] {2 , 3 , 6}   [g] {3 , 6}

10 [a] 2   [b] 8 , 9   [c] e

11

12

13 [a] {4 , 5}

[b] {5}

[c] {5}

Exercise 13

1

	The sentence	The symbol
[a]	6 is an element of the set X	6 ∈ X
[b]	5 belongs to the set Y	5 ∈ Y
[c]	B does not belong to the set M	B ∉ M
[d]	7 does not belong to the set N	7 ∉ N
[e]	B is an element of the set K	B ∈ K

2 [a] ∈ [b] ∉ [c] ∉ [d] ∈
[e] ∈ [f] ∉ [g] ∈ [h] ∉
[i] ∉ [j] ∈ [k] ∉ [l] ∉
[m] ∉ [n] ∉ [o] ∉ [p] ∉

3 [a] ∈ [b] ∉ [c] ∉ [d] ∈
[e] ∉ [f] ∉ [g] ∉ [h] ∉
[i] ∈ [j] ∉

4 [a] ∈ [b] ∈ [c] ∉ [d] ∈
[e] ∉ [f] ∈ [g] ∉ [h] ∉

5 [a] ∈ [b] ∈ [c] ∉ [d] ∉
[e] ∉ [f] ∉

6 [a] true [b] false [c] true [d] false
[e] true [f] false

7 [a] 4 [b] 5 [c] 5 or 7 [d] 7
[e] 5 [f] 1 [g] 3 [h] 2 or 5

8 [a] not null [b] null [c] not null
[d] null [e] null [f] null
[g] not null [h] not null [i] null
[j] not null [k] null [l] null

9

The set	Finite	Number of elements	Infinite
[a] The set of days in a week	✓	7	✗
[b] {0 , 3 , 6 , 9 , 12}	✓	5	✗
[c] {30 , 32 , 34 , ...}	✗	✗	✓
[d] {1 , 3 , 5 , ... , 99}	✓	99	✗
[e] The set of the months in a Gregorian year	✓	12	✗
[f] The set of dinosaurs in the zoo	✓	Zero	✗
[g] The set of pages of this book	✓	look by yourself	✗
[h] The set of the odd numbers	✗	✗	✓
[i] The set of cats with 3 heads	✓	zero	✗
[j] The set of alphabet in the English language	✓	26	✗
[k] The set of multiples of the number 5	✗	✗	✓
[l] The set of prime numbers less than 20	✓	8	✗
[m] The set of factors of the number 3	✓	2	✗
[n] The set of prime even numbers.	✓	1	✗
[o] The set of the letters forming the word "Sondos"	✓	4	✗
[p] The set of counting number less than 10000	✓	9999	✗
[q] The set of counting numbers greater than 10000	✗	✗	✓
[r] The set of whole numbers which are divisible by 3	✗	✗	✓

10 [a] Any number except 7 and 9

[b] Any number except 1 , 2 and 4

[c] 3 or 5

[d] 2

Exercise 14

1 [a] ✓ [b] ✓ [c] ✗ [d] ✗
[e] ✗ [f] ✗ [g] ✓ [h] ✗
[i] ✗ [j] ✗ [k] ✓

2 Yes

3

- {6 , 8 , 9} : the set of the digits of 9688
- {10 , 12 , 14 , ... , 98} : the set of the even numbers that have 2 digits.
- {3 , d} : {d , 3}
- {z , i , e , w , l} : the set of the letters forming the word (Ziwel)
- The set of the seasons of the year : {summer , winter , spring , autumn}
- ∅ : the set of the months in a year that have 35 days

4 [a] 3 [b] 4 [c] 4 [d] 5
[e] 4 [f] 4 [g] 4

5 [a] a = 2 , b = 7 [b] a = 9 , b = 5
[c] a = 4 , b = 5

6 $x = 6 , y = 4$
[a] $x - y = 6 - 4 = 2$ [b] $x + y = 6 + 4 = 10$
[c] $x \times y = 6 \times 4 = 24$ [d] $\frac{x}{y} = \frac{6}{4} = \frac{3}{2}$

7 a = 7 , b = 5 , c = 4

8 [a] ⊂ [b] ⊄ [c] ⊂ [d] ⊂
[e] ⊄ [f] ⊄ [g] ⊂ [h] ⊄
[i] ⊄ [j] ⊄ [k] ⊄ [l] ⊄
[m] ⊂ [n] ⊂ [o] ⊂ [p] ⊂
[q] ⊄ [r] ⊄

9 [a] ⊂ [b] ⊄ [c] ⊄ [d] ⊂
[e] ⊂ [f] ⊂

10 [a] ⊂ [b] ⊄ [c] ∈ [d] ⊂
[e] ⊂ [f] ∉ [g] ∉ [h] ⊄
[i] ⊄ [j] ∈ [k] ∉ [l] ⊄
[m] ⊂ [n] ⊄ [o] ∈ [p] ⊄
[q] ∉ [r] ⊄ [s] ∉ [t] ⊂

11 [a] ⊂ [b] ∈ [c] ⊂ [d] ∈
[e] ∈ [f] ⊂

12 [a] (1) X = {1 , 5} (2) Y = {1 , 3 , 5}
(3) Z = {1 , 3 , 5 , 7}
[b] (1) ⊂ (2) ⊂ (3) ⊄ (4) ⊂

13 [a] ∈ [b] ⊂ [c] ⊄ [d] ∉
[e] ⊂ [f] ⊄

14 [a] {8} , ∅ [b] {99} , ∅
[c] {5} , {6} , {5 , 6} , ∅
[d] {3} , {5} , {9} , {3 , 5} , {3 , 9} , {5 , 9} , {3 , 5 , 9} , ∅
[e] {h} , {o} , {d} , {h , o} , {h , d} , {o , d} , {h , o , d} , ∅

15 [a] $x = 5$ [b] $x = 5$ [c] $x = 4$
[d] $x = 0$ [e] $x = 10$

[f] $x = 1$ or $x = 2$
[g] $x = 3$ or $x = 7$ or $x = 9$
[h] $x = 2$ [i] $x = 5$ [j] $x \neq 2 , x \neq 5$
[k] $x \neq 7 , x \neq 1 , x \neq 3$ [l] $x \neq 5$ or $x \neq 6$
[m] 3

16 $x = 6$

17 $x = 4$ or $x = 7 , y = 5$

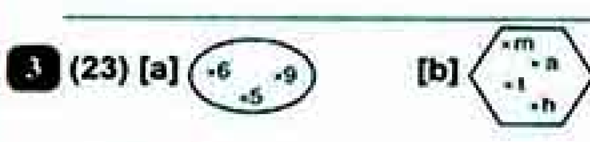
18 $x = 5$

Test on the first part of unit two

1 (1) ⊂ (2) an infinite
(3) ∈ (4) ⊂
(5) 2 (6) ∉
(7) ✓ (8) {1 , 6 , 9}
(9) ∉ (10) ⊄
(11) 4 (12) 6
(13) ⊂ (14) 1

2 (15) 8 (16) 9 , 5
(17) 0 (18) {0 , 2 , 4 , 6 , 8}
(19) {2 , 3 , 4} , {3 , 5 , 7}
(20) empty
(21) East , West , North and South
(22) 4

3 (23) [a] [b]



(24) [a] l , e , t and r
[b] 1 , 3 , 5 and 7
(25) ∅ , {1 , 2 , 3} , {1} , {2} , {3} , {1 , 2} , {1 , 3} and {2 , 3}
(26) [a] {1 , 2 , 4 , 5 , 10 , 20}
[b] {red , white , black}

Exercise 15

1 Fig. (1) X ∩ Y = {2}
Fig. (2) X ∩ Y = {1 , 5}

Fig. (3) X ∩ Y = {1 , 5 , 8}
Fig. (4) X ∩ Y = ∅

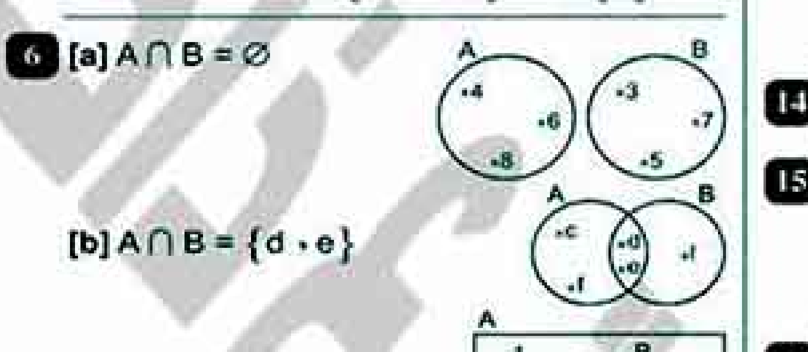
2 [a] X ∩ Y = {4 , 5} [b] X ∩ Z = ∅
[c] Y ∩ Z = {13 , 17} [d] X ∩ Y ∩ Z = ∅

3 [a] A ∩ B = {d , e} [b] B ∩ C = {b , e}
[c] C ∩ A = {e , c} [d] A ∩ B ∩ C = {e}

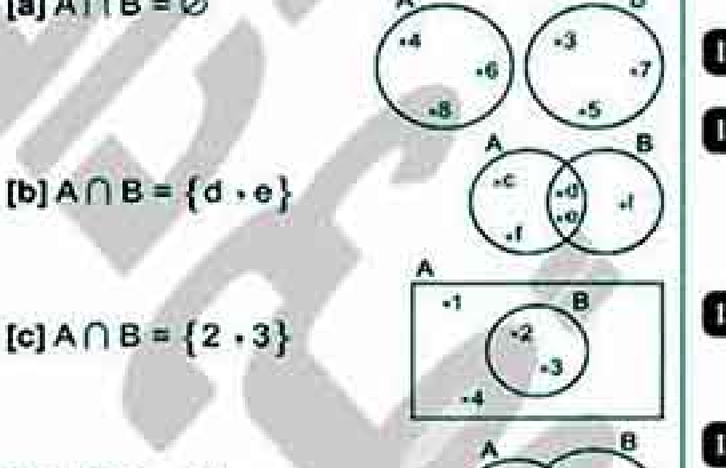
4 X = {1 , 2 , 3 , 4} , Y = {4 , 5 , 6 , 7 , 8} , Z = {7 , 8 , 9}
[a] X ∩ Y = {4} [b] X ∩ Z = ∅
[c] Y ∩ Z = {8 , 7}
[d] {5 , 6 , 7 , 8} ∩ Z = {7 , 8}
[e] {3 , 2} ∩ X = {3 , 2}
[f] {2 , 5 , 8} ∩ Y = {5 , 8}

5 [a] {5} [b] {3 , 2} [c] {5}
[d] {1 , 2 , 9} [e] ∅ [f] {2}
[g] {3 , 6} [h] ∅ [i] {1 , 14}
[j] ∅ [k] ∅ [l] ∅
[m] ∅ [n] {1} [o] ∅
[p] ∅ [q] {3 , 4 , 5 , 6}
[r] ∅ [s] {1 , 3 , 5} [t] {4}

6 [a] A ∩ B = ∅



[b] A ∩ B = {d , e}



[c] A ∩ B = {2 , 3}

[d] A ∩ B = {l}

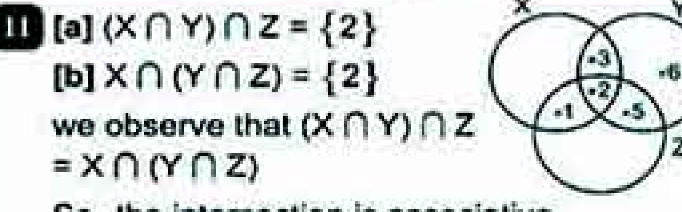
7 [a] A ∩ B = {3 , 7} [b] B ∩ C = {11}
[c] C ∩ A = {1 , 5}

8 [a] A ∩ B = {x , z} [b] B ∩ C = {m , n}
[c] C ∩ A = {y}

9 [a] X ∩ Y = {2}
[b] Y ∩ Z = {0 , 2 , 4 , 6 , 8 , 10}

10 [a] X ∩ Y = {3 , 5}
[b] Z ∩ X = {2 , 5}
[c] Y ∩ Z = {0 , 5}
[d] X ∩ Y ∩ Z = {5}

11 [a] (X ∩ Y) ∩ Z = {2}
[b] X ∩ (Y ∩ Z) = {2}
we observe that (X ∩ Y) ∩ Z = X ∩ (Y ∩ Z)
So, the intersection is associative



12 Fig. (1) Fig. (2) Fig. (3) Fig. (4)

13 Fig. (1) Fig. (2) Fig. (3)
Fig. (4) Fig. (5) Fig. (6)

14 [a] ∈ [b] ⊄ [c] ⊂ [d] ⊂

15 [a] ∈ [b] ⊂ [c] ⊂ [d] ⊄
[e] ∉ [f] ⊄ [g] ∉ [h] ⊂
[i] ∉ [j] ⊂ [k] ⊂ [l] ⊂

16 [a] ∉ [b] ⊄ [c] ∈ [d] ⊂
[e] ⊄

17 [a] X , Y [b] X [c] Y ⊂ X
[d] disjoint [e] Y , X [f] ∅ [g] X

18 [a] 5 [b] 3 [c] 2 [d] 5
[e] 3 [f] 6 [g] 1

19

Exercise 16

1 Fig. (1) : {1 , 3 , 2 , 7}
Fig. (2) : {1 , 2 , 5 , 9}
Fig. (3) : {9 , 7 , 10 }
Fig. (4) : {a , c , e , b , d}

2 [a] {2 , 4} [b] {1 , 3 , 5}
[c] {1 , 2 , 3 , 12} [d] {a , b , c , h}
[e] {1 , 5 , 7} [f] {2 , 4}
[g] {3} [h] {5 , 55}
[i] {0 , 20} [j] {15 , 51}
[k] {5 , 3 , 35} [l] {5 , 4 , 1 , 45}
[m] {2 , 4} [n] {1 , 4 , 6}
[o] {2 , 3 , 4 , 5 , 6 , 7} [p] {b , o , k , m}

3 X ∪ Y = {1 , 2 , 3 , 4 , 5 , 7}
Y ∪ X = {1 , 2 , 3 , 4 , 5 , 7}
• We observe that X ∪ Y = Y ∪ X
So, the union is commutative.

4 (X ∪ Y) ∪ Z = {1 , 2 , 3 , 5 , 6}
X ∪ (Y ∪ Z) = {1 , 2 , 3 , 5 , 6}
• We observe that (X ∪ Y) ∪ Z = X ∪ (Y ∪ Z)
So, the union is associative.

5 [a] A ∪ B = {1 , 2 , 6 , 7 , 8}
[b] A ∪ B = {5 , 11 , 12 , 15}
[c] A ∪ B = {1 , 2 , 3 , 4}

6 [a] X ∪ Y = {2 , 3 , 5 , 6}
[b] X ∪ Z = {2 , 3 , 5}
[c] Z ∪ Y = {3 , 5 , 6}
[d] X ∪ Y ∪ Z = {2 , 3 , 5 , 6}

7

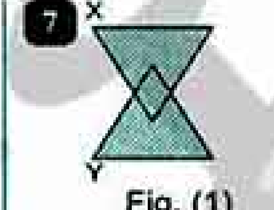


Fig. (1)



Fig. (2)

Fig. (3)



Fig. (4)

8 [a] {1 , 2 , 4 , 5 , 6} [b] {5}
[c] {2 , 3 , 4 , 5} [d] ∅
[e] {1 , 2 , 3 , 5 , 6} [f] {2}
[g] {1 , 2 , 3 , 4 , 5 , 6} [h] ∅
[i] {2 , 3 , 5}

9 [a] ⊂ [b] ∉ [c] ∉ [d] ⊂
[e] ⊄ [f] ∈ [g] ⊂ [h] ⊂

10 [a] A ∪ B [b] A ∩ B [c] Y or X ∩ Y
[d] X ∪ Y ∪ Z [e] X ∩ Y ∩ Z [f] Z ∪ Y
[g] Z ∪ X [h] (Z ∪ X) ∩ Y [i] Z ∪ (X ∩ Y)
[j] X ∪ (Y ∩ Z)

11 [a] X ∪ Y [b] X ∩ Y [c] X , Y
[d] X ⊂ Y [e] Y ⊂ X [f] disjoint
[g] empty sets [h] equal sets
[i] X ∩ Y = Y ∩ X , X ∪ Y = Y ∪ X
[j] ∅ , X [k] X , X [l] ∅ , ∅

12 [a] 3 [b] 5 [c] 6
[d] 5 [e] 3 or 4 [f] 7

13

Fig. (1)

Fig. (2)

Fig. (3)

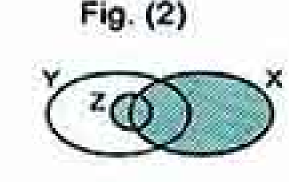


Fig. (4)



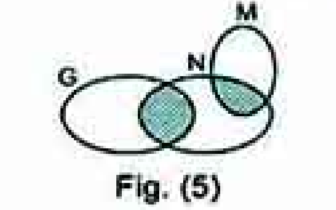
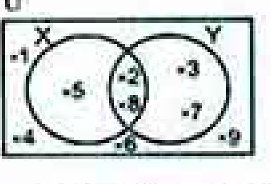


Fig. (5)

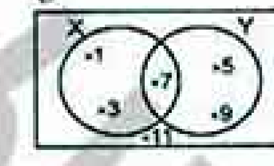
Exercise 17

1 [a] U = The set of even numbers.
[b] U = The set of odd numbers.
[c] U = The set of days of the week.
[d] U = The set of cities of Egypt.
[e] U = The set of African countries.
[f] U = The set of teachers at your school.
[g] U = The set of the geometrical instruments.
[h] U = The set of the Egyptian writers.
There are other answers [from (a) to (h)]

2 [a] U = {1 , 2 , ... , 9}



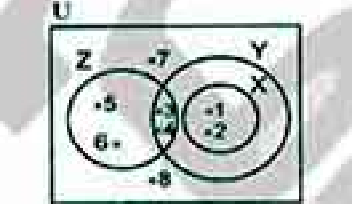
[b] U = The set of odd numbers less than 12



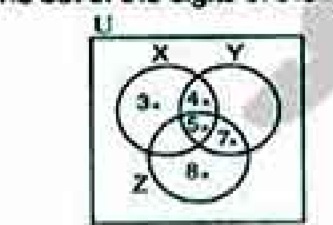
[c] U = The set of whole numbers formed from two similar digits.



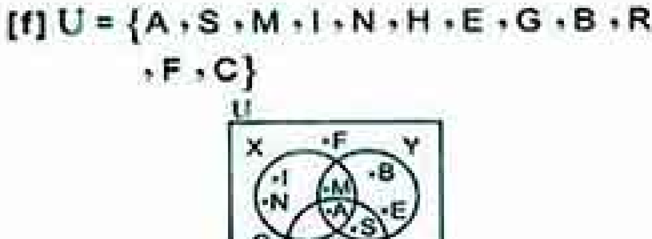
[d] U = The set of whole numbers less than 9

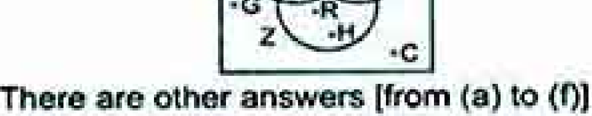


[e] U = The set of the digits of the number 85734



[f] U = {A , S , M , I , N , H , E , G , B , R , F , C}





There are other answers [from (a) to (f)]

3 [a] U = {1 , 2 , 3 , 4 , 5}
[b] A = {2 , 3 , 5} [c] A` = {1 , 4}

4 [a] U = {1 , 2 , 3 , 4 , 5 , 6 , 7}
[b] A = {1 , 2 , 3}
[c] B = {4 , 5 , 6} [d] A` = {4 , 5 , 6 , 7}
[e] B` = {1 , 2 , 3 , 7}

5 [a] U = {A , B , C , D , E , F}
[b] X = {A , B}
[c] X` = {C , D , E , F}
[d] X ∩ X` = ∅
[e] X ∪ X` = {A , B , C , D , E , F} = U

6 [a] X` = {4 , 5 , 6 , 7}
[b] Y` = {1 , 2 , 3 , 6 , 7}
[c] X ∩ Y = ∅
[d] (X ∩ Y)` = {1 , 2 , 3 , 4 , 5 , 6 , 7}
[e] X ∪ Y = {1 , 2 , 3 , 4 , 5}
[f] (X ∪ Y)` = {6 , 7}
[g] X` ∩ X = ∅
[h] X` ∩ Y` = {6 , 7}
[i] X` ∪ Y` = {1 , 2 , 3 , 4 , 5 , 6 , 7}

7 [a] X` = {2 , 5 , 6 , 8}
[b] Y` = {4 , 5 , 7 , 8}
[c] X` ∪ Y` = {2 , 4 , 5 , 6 , 7 , 8}
[d] X` ∩ Y` = {5 , 8}
[e] (X ∪ Y)` = {5 , 8}
[f] (X ∩ Y)` = {2 , 4 , 5 , 6 , 7 , 8}

8 [a] U = {1 , 2 , 3 , 4 , 5 , 6 , 7}
[b] X = {1 , 3 , 5}
[c] Y = {5 , 6 , 7}

[d] $X' = \{2, 4, 6, 7\}$
[e] $Y' = \{1, 2, 3, 4\}$
[f] $Y \cup X = \{1, 3, 5, 6, 7\}$
[g] $Y \cap X = \{5\}$
[h] $(Y \cup X)' = \{2, 4\}$

9
[a] $X \cap Y = \{1, 2\}$
[b] $(X \cap Y)' = \{3, 4, 7, 9\}$
[c] $X \cup Y = \{1, 2, 3, 4\}$
[d] $(X \cup Y)' = \{7, 9\}$
[e] $X' \cap Y' = \{7, 9\}$
[f] $X' \cup Y' = \{3, 4, 7, 9\}$
[g] $U \cap X = \{1, 2, 3, 4\}$
[h] $U \cup Y = \{1, 2, 3, 4, 7, 9\}$
[i] $U' = \varnothing$
[j] $\varnothing \cap U = \varnothing$

10 $A' = \{4, 12\}$

11 $A \cup B = \{2, 4, 6, 8, 10, 12, 14\}$
$(A \cup B)' = \{0\}$
$A \cap B = \{6\}$
$(A \cap B)' = \{0, 2, 4, 8, 10, 12, 14\}$

12
[a] $X' = \{1, 2, 5, 7, 9\}$
[b] $Y' = \{2, 4, 5, 7, 10\}$
[c] $X \cap Y = \{3\}$
[d] $(X \cap Y)' = \{1, 2, 4, 5, 7, 9, 10\}$
[e] $(X \cup Y)' = \{2, 5, 7\}$
[f] $X' \cap Y' = \{2, 5, 7\}$

13
[a] $X' = \{1, 2, 6\}$
[b] $Y' = \{4, 5, 6\}$
[c] $X \cap Y = \{3\}$
[d] $(X \cap Y)' = \{1, 2, 4, 5, 6\}$
[e] $X \cup Y = \{1, 2, 3, 4, 5\}$
[f] $(X \cup Y)' = \{6\}$
[g] $X' \cup Y' = \{1, 2, 4, 5, 6\}$
[h] $X' \cap Y' = \{6\}$

14
[a] $X \cap Y = \{1, 5\}$
[b] $(X \cap Y)' = \{3, 7, 9, 11, 13, 15, 17, 19\}$
[c] $X \cup Y = \{1, 5, 15, 3, 13, 19\}$

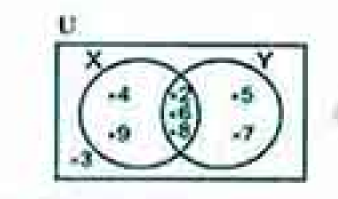
[d] $(X \cup Y)' = \{7, 9, 11, 17\}$
[e] $X' \cap Y' = \{7, 9, 11, 17\}$
[f] $X' \cap X = \varnothing$
[g] $X' \cup Y = \{7, 9, 11, 13, 17, 19, 1, 5\}$

15
[a] X' [b] Y' [c] $(X \cup Y)'$
[d] $(X \cap Y)'$ [e] $X' \cap Y$ [f] $Y' \cap X$

16
[a] $X \cap Y$ [b] Y' [c] X'
[d] $(X \cup Y)'$ [e] $(X \cap Y)'$

17
[a] $U, \varnothing, X$ [b] $U, X', X', \varnothing$
[c] $\varnothing, U$

18
[a] $U = \{2, 3, 4, 5, 6, 7, 8, 9\}$
$X = \{2, 4, 6, 8, 9\}$
$Y = \{2, 5, 6, 7, 8\}$
[b]



[c] $X \cap Y = \{2, 6, 8\}$
$X \cup Y = \{2, 4, 5, 6, 7, 8, 9\}$
$X' \cap Y = \{5, 7\}$
$X \cup Y' = \{2, 3, 4, 6, 8, 9\}$
$(X \cap Y)' = \{3, 4, 5, 7, 9\}$
$(X \cup Y)' = \{3\}$

Exercise 18

1
Fig. (1) : (a) $X - Y = \{4, 5, 7\}$
(b) $Y - X = \{1, 2\}$
Fig. (2) : (a) $X - Y = \{1, 2, 3\}$
(b) $Y - X = \{4, 5, 6, 7\}$
Fig. (3) : (a) $X - Y = \{3, 5, 7\}$
(b) $Y - X = \varnothing$
Fig. (4) : (a) $X - Y = \varnothing$
(b) $Y - X = \varnothing$
Fig. (5) : (a) $U - X = \{1, 2\}$
(b) $X - U = \varnothing$
(c) $U - X' = \{3, 4\}$

Fig. (6) : (a) $X - Y = \{2, 4, 5\}$
(b) $Y - X = \{0\}$
(c) $X - Z = \{1, 2, 3, 4\}$
(d) $Z - X = \varnothing$

2
[a] $\{1\}$ [b] $\{d\}$ [c] $\{3\}$ [d] $\{13\}$
[e] $\varnothing$ [f] $\{2, 5\}$ [g] $\varnothing$ [h] $\varnothing$
[i] $\varnothing$ [j] $\{5, 6\}$ [k] $\{33\}$ [l] $\{45\}$
[m] $\{52\}$ [n] $\{\ \}$

3
[a] $X - Y = \{E, F\}$ [b] $Y - X = \{C\}$
[c] $X - Z = \{A, B, F\}$ [d] $Z - Y = \{E\}$

4
[a] $X - Y = \{5, 12\}$ [b] $Y - X = \{2, 3\}$
[c] $X - Z = \{10, 12\}$ [d] $Z - X = \{1, 3\}$
[e] $Y - Z = \{2, 10\}$ [f] $Z - Y = \{1, 5\}$

5
[a] $X \cap Y = \{1, 2\}$
[b] $X \cup Y = \{1, 2, 3, 4, 5\}$
[c] $X' = \{3, 4, 6, 7, 8\}$
[d] $Y' = \{5, 6, 7, 8\}$
[e] $X - Y = \{5\}$
[f] $Y - X = \{3, 4\}$
[g] $(X \cap Y)' = \{3, 4, 5, 6, 7, 8\}$
[h] $(X \cup Y)' = \{6, 7, 8\}$
[i] $U - (X \cap Y) = \{3, 4, 5, 6, 7, 8\}$
[j] $U - (X \cup Y) = \{6, 7, 8\}$
[k] $(X - Y)' = \{1, 2, 3, 4, 6, 7, 8\}$
[l] $(Y - X)' = \{1, 2, 5, 6, 7, 8\}$

6
[a] $X \cap Y = \{3, 4\}$
[b] $X \cup Y = \{1, 2, 3, 4, 5\}$
[c] $X - Y = \{1, 2\}$
[d] $Y' - X = \{6, 7\}$
[e] $Y' = \{1, 2, 6, 7\}$
[f] $(X \cup Y)' = \{6, 7\}$

7
[a] $X - Y = \{3, 4\}$, $Y - X = \{2, 6\}$
[b] $X - Z = \{1, 4\}$, $Z - X = \{6, 7\}$
[c] $Y - Z = \{1, 2\}$, $Z - Y = \{3, 7\}$
[d] $X \cap Y = \{1, 5\}$ [e] $X \cap Z = \{3, 5\}$
[f] $Y \cap Z = \{5, 6\}$

[g] $X \cup Y = \{1, 2, 3, 4, 5, 6\}$
[h] $X \cup Z = \{1, 3, 4, 5, 6, 7\}$
[i] $Y \cup Z = \{1, 2, 3, 5, 6, 7\}$
[j] $X' = \{2, 6, 7\}$ [k] $Y' = \{3, 4, 7\}$
[l] $Z' = \{1, 2, 4\}$ [m] $X \cap Y \cap Z = \{5\}$
[n] $X \cup Y \cup Z = \{1, 2, 3, 4, 5, 7, 6\}$

8
[a] $X - Y = \{6, 9\}$, $Y - X = \{1, 5, 7, 8\}$
[b] $Y - Z = \{1, 5, 3\}$, $Z - Y = \{2, 4\}$
[c] $X - Z = \{3, 6, 9\}$, $Z - X = \{2, 4, 7, 8\}$
[d] $X' = \{1, 2, 4, 5, 7, 8, 10, 11\}$
[e] $Y' = \{2, 6, 4, 9, 10, 11\}$
[f] $Z' = \{1, 5, 3, 6, 9, 11, 10\}$
[g] $X \cap Y = \{3\}$ [h] $Y \cap Z = \{7, 8\}$
[i] $X \cap Z = \varnothing$
[j] $X \cup Z = \{2, 4, 7, 8, 3, 6, 9\}$
[k] $X \cup Y = \{1, 5, 7, 8, 3, 6, 9\}$
[l] $(X \cap Y)' = \{1, 2, 4, 5, 6, 7, 8, 9, 10, 11\}$
[m] $(Y \cup Z)' = \{6, 9, 10, 11\}$
[n] $(Y - X) \cap (Y - Z) = \{1, 5\}$

9
$X \cup Y = \{2, 3, 4, 5\}$
$X \cap Y = \{3, 5\}$
$X - Y = \{2\}$
$X' = \{1, 4, 6\}$

U, X, Y: ·2, ·3, ·5, ·4, ·1, ·6

10
[a] $X - Y = \{d, h\}$
[b] $Y - Z = \{a, r\}$
[c] $Z - X = \{b, f\}$
[d] $X' \cup Y' = \{b, d, h, f, r, l, m\}$
[e] $X' \cap Y' = \{f, l, m\}$
[f] $X' - Y' = \{b, r\}$
[g] $Y - X' = \{a, c\}$
[h] $(X - Y) \cup Z = \{b, c, d, h, f\}$
[i] $(X \cup Y) - Z' = \{c, b, h\}$

11
[a] $\varnothing, X'$ [b] $\varnothing, X$ [c] $\varnothing$
[d] X, Y [e] $Y, X, \varnothing$
[f] X or Y, X or Y, $\varnothing$, $\varnothing$

12 [a] $x = 2$ [b] $x = 5$ [c] $x = 8$
[d] $x = 2$ [e] $x = 12$ [f] $x = 3$
[g] $x = 5$ [h] $x = 8$

13 Fig. (1) : X – Y
Fig. (2) : Y – X
Fig. (3) : Y or Y ∩ X
Fig. (4) : Y`
Fig. (5) : Y – X
Fig. (6) : X ∪ Y
Fig. (7) : (X ∪ Y)`
Fig. (8) : (X ∩ Y)`
Fig. (9) : (X ∪ Y) – (X ∩ Y) or (X – Y) ∪ (Y – X)

14 X = {2 , 3 , 4}
Y = {4 , 6}

Test on the second part of unit two

1 (1) Y (2) X ∩ Y
(3) ∅ (4) {6 , 8}
(5) {2 , 4 , 5 , 7} (6) {4 , 9}

(7) {2 , 6} (8) {1 , 6 , 9}
(9) ∈ (10) 5
(11) ⊄ (12) ∅
(13) ∅ (14) {1 , 7}

2 (15) ∪ (16) A , B
(17) ∅ (18) {2 , 5}
(19) disjoint (20) {2 , 3 , 4 , 5}
(21) {5 , 10} (22) ∅

3 (23) [a] {3} [b] {1 , 2 , 3 , 5 , 7}
[c] {1 , 2} [d] {4 , 5 , 6 , 7}
[e] {1 , 2 , 3 , 4 , 5 , 6 , 7}
(24) [a] B – A [b] A ∪ B
(25) [a] {4 , 5}
[b] {7}
[c] {1 , 2 , 3 , 6 , 8}
[d] {1 , 3 , 8}
(26) [a] 5 [b] 9 [c] 1

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Unit Three

Note : The drawn lengths are not real.

Exercise 19

1 [a] compasses
[b] equal [c] equal
[d] two points on the circle
[e] the centre of a circle
[f] diameter
[g] the centre [h] of the radius
[i] 10 [j] 3.6

2 [a] diameter [b] chord
[c] radius [d] centre

3 [a] $\overline{AB}$ [b] $\overline{BC}$
[c] $\overline{MB}$ or $\overline{MA}$ or $\overline{MC}$ [d] 8
[e] 4 [f] AB

4 [a] $\overline{MA}$, $\overline{MB}$, $\overline{MC}$, $\overline{MD}$
[b] $\overline{AC}$ [c] $\overline{AB}$, $\overline{AD}$, $\overline{BC}$, $\overline{CD}$

5 [a] ✓ [b] ✓ [c] ✓
[d] ✓ [e] ✗ [f] ✓

6 [a] > [b] < [c] <
[d] < [e] = [f] =

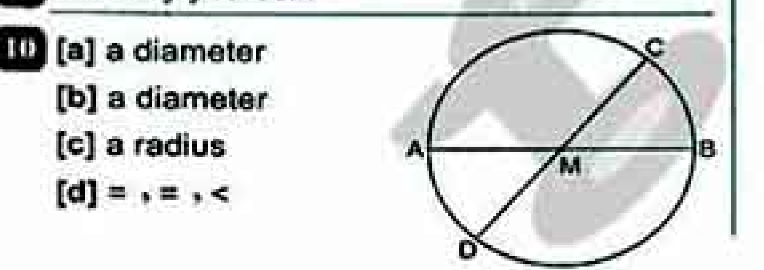
7 [a] diameter [b] chord [c] half
[d] 16 [e] outside [f] diameter
[g] chord [h] 18 [i] 5
[j] 7

8

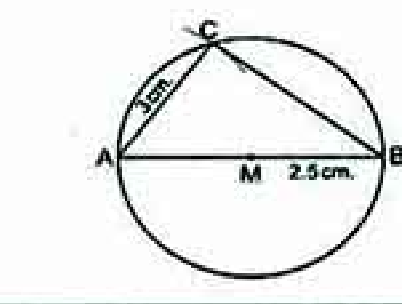
Radius	3 cm.	5 cm.	8 cm.	11 cm.	18 cm.	3.4 cm.	1.8 cm.	4.7 cm.
Diameter	6 cm.	10 cm.	16 cm.	22 cm.	36 cm.	6.8 cm.	3.6 cm.	9.4 cm.

9 Draw by yourself.

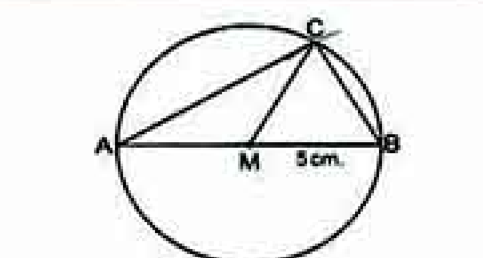
10 [a] a diameter
[b] a diameter
[c] a radius
[d] = , = , <



11 By measuring :
BC = 4 cm.

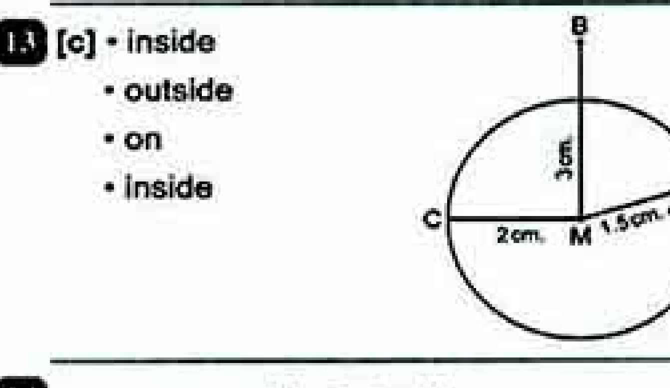


12

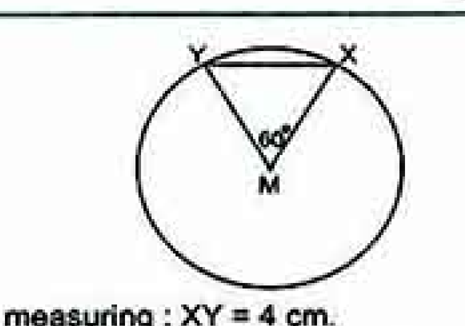


- The triangle ABC is a right-angled triangle (according to its measures of angles) and a scalene triangle (according to its side lengths)
- The triangle MBC is an acute-angled triangle (according to its measures of angles) and an equilateral triangle (according to its side lengths).

13 [c] • inside
• outside
• on
• inside

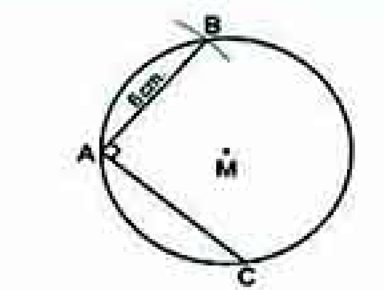


14



- By measuring : XY = 4 cm.

15

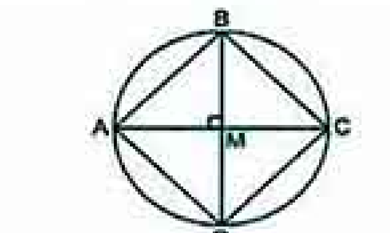


- By measuring : AC = 6.7 cm.

16

- By measuring :
  The length of diameter of the circle B is 7 cm.

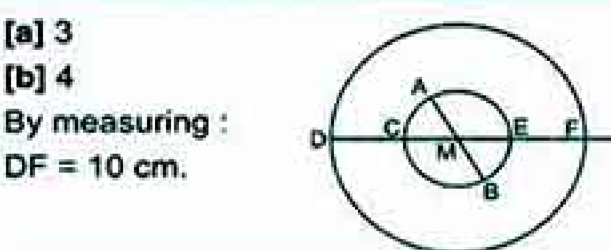
17



The figure ABCD is a square.

18 The side length of the square ABCD = 6 cm.
, then the perimeter of the square ABCD = 6 × 4
= 24 cm.

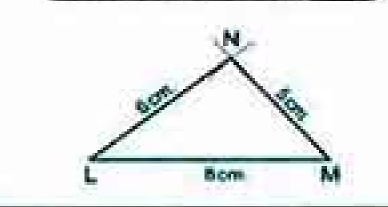
19 [a] 3
[b] 4
By measuring :
DF = 10 cm.



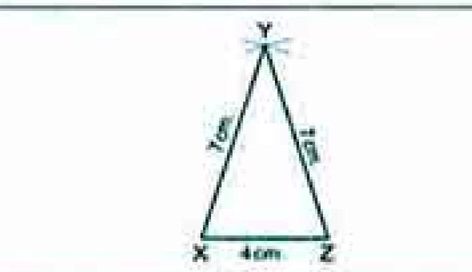
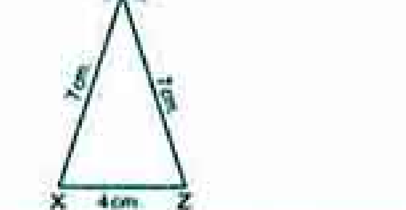
20 8 , 16

Exercise 20

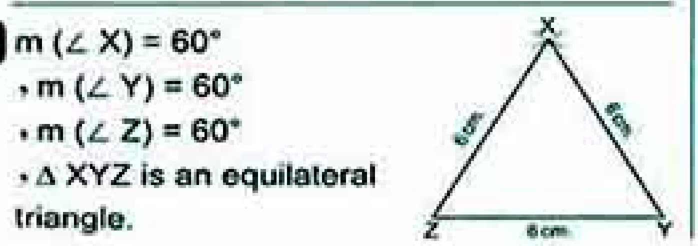
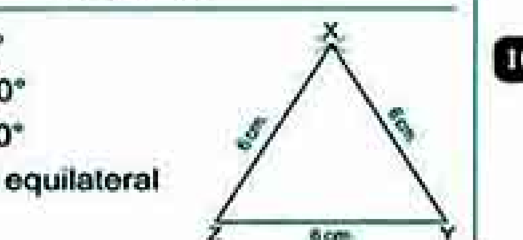
1



2

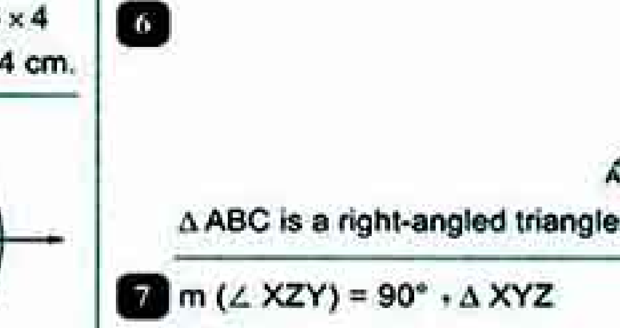
3 m (∠ X) = 60°
, m (∠ Y) = 60°
, m (∠ Z) = 60°
, Δ XYZ is an equilateral triangle.

4

5 The side length of the triangle
= 9 ÷ 3 = 3 cm.

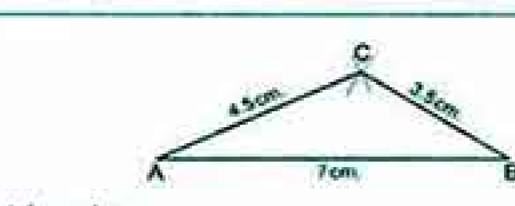
6



Δ ABC is a right-angled triangle.

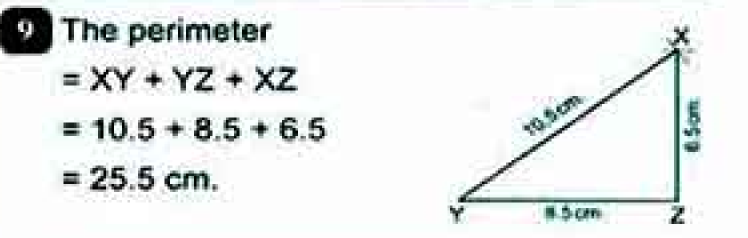
7 m (∠ XZY) = 90° , Δ XYZ
is a right-angled triangle

8



Scalene triangle.

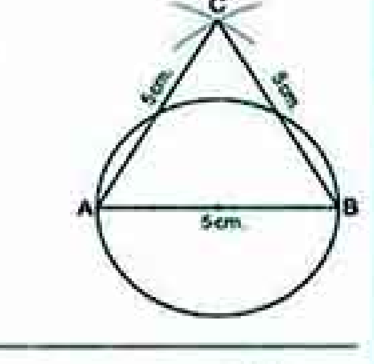
9 The perimeter
= XY + YZ + XZ
= 10.5 + 8.5 + 6.5
= 25.5 cm.



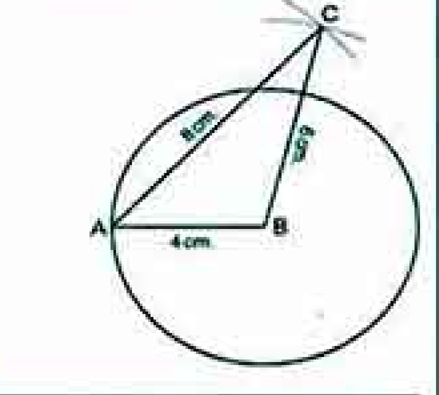
10 m (∠ ADB) = 90° ,
AD = 4 cm.

Answers of the Main Book

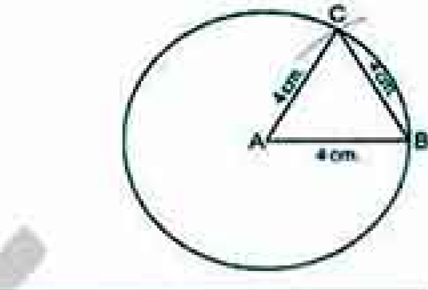
11 [a] outside
[b] something else



12 [a] on
[b] outside
[c] $\overline{AB}$



13 [a] a radius
[b] a radius
[c] a chord



14

[a] The perimeter of the triangle ABC
= 6 + 8 + 10 = 24 cm.
[b] m (∠ ABC) = 90°
[c] AM = 5 cm. , BM = 5 cm. , CM = 5 cm.
, we notice that they are equal in length.
[d] obtuse-angled triangle.
[e] The triangle AMB and the triangle BMC

15



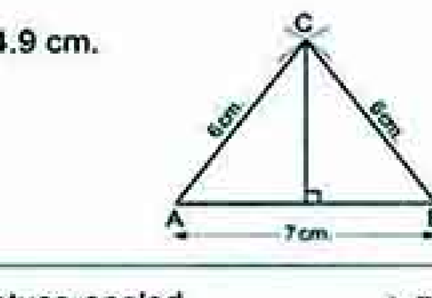
16 We cannot draw the triangle.

Exercise 21

1 Fig.(1) : The altitude is $\overline{AD}$ and its base is $\overline{BC}$
Fig.(2) : The altitude is $\overline{XE}$ and its base is $\overline{YZ}$
Fig.(3) : The altitude is $\overline{LN}$ and its base is $\overline{MN}$
(There is another solution)
Fig.(4) : The altitude is $\overline{PR}$ and its base is $\overline{OQ}$
Fig.(5) : The altitude is $\overline{TU}$ and its base is $\overline{SV}$
Fig.(6) : The altitude is $\overline{FG}$ and its base is $\overline{GH}$
(There is another solution)

2 LX ≃ 4 cm.
MY ≃ 3.3 cm.

3 The length of the altitude ≃ 4.9 cm.

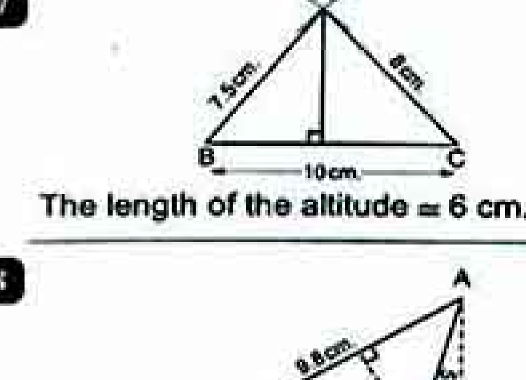


4 Δ XYZ is an obtuse-angled triangle
The length of the altitude ≃ 2.6 cm.

5 CD ≃ 5.6 cm. , AE ≃ 7.4 cm. ,
BF ≃ 5.6 cm.
The three altitudes intersect at one point inside the triangle.

6 AD ≃ 5.2 cm.
BE ≃ 5.2 cm.
CF ≃ 5.2 cm.
The altitudes meet at one point inside the triangle and they are equal in length.

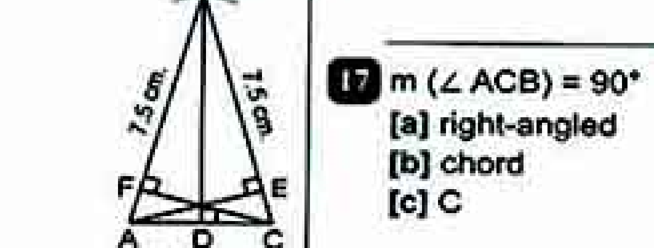
7



The length of the altitude ≃ 6 cm.

8

9 BD ≃ 7.2 cm.
CF ≃ 3.9 cm.
AE ≃ 3.9 cm.

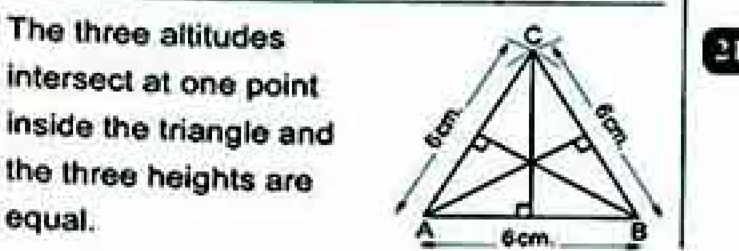


10 AD ≃ 4.3 cm.
BE ≃ 2.7 cm.
yes , $\overline{AD}$ and $\overline{BE}$ intersect at one point

11 ZA ≃ 6.1 cm.

12 AD = 4.8 cm.

13 The three altitudes intersect at one point inside the triangle and the three heights are equal.



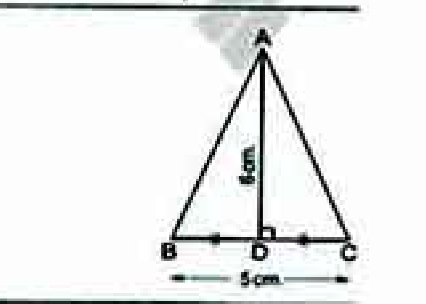
14 BD ≃ 3.5 cm.

15 C is the point of intersection

16 measure the length of $\overline{CD}$ by yourself

17 m (∠ ACB) = 90°
[a] right-angled
[b] chord
[c] C

18 AB = 6.5 cm.
AC = 6.5 cm.
We notice that :
AB = AC



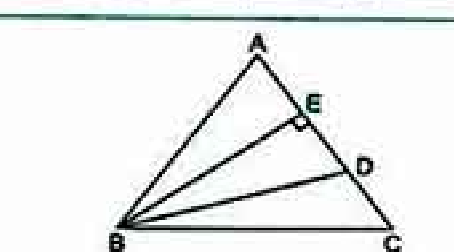
19 Two locations

XY = 3 cm.

20

The triangle	Δ ABC	Δ AMB	Δ AMC	Δ MBC
Its altitudes	$\overline{AF}$ $\overline{BE}$ $\overline{CD}$	$\overline{MD}$ $\overline{AE}$ $\overline{BF}$	$\overline{ME}$ $\overline{AD}$ $\overline{CF}$	$\overline{MF}$ $\overline{CE}$ $\overline{BD}$

21

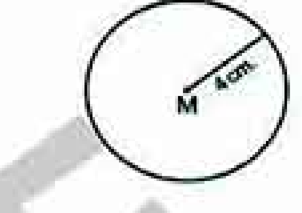


Test on unit three

1
(1) 3 (2) diameter
(3) 15 (4) outside
(5) 10 (6) right
(7) centre (8) chord
(9) scalene (10) outside
(11) chord (12) $\overline{AD}$
(13) 24 (14) <

2
(15) diameter
(16) the vertex of the right angle
(17) equal in length
(18) 6 cm. (19) 3
(20) [a] $\overline{XY}$ [b] radius
(21) height (22) diameter

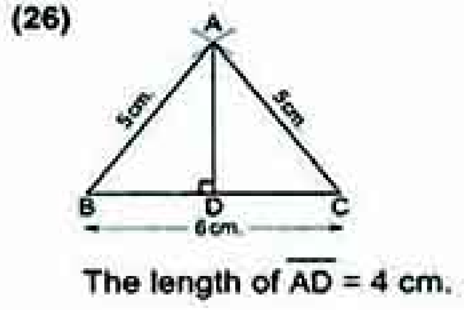
3 [23]



(24)

m (∠ B) = 90°

(25) [a] The length of $\overline{AC}$ = 6 cm.
[b] m (∠ C) = 90°



(26)

The length of $\overline{AD}$ = 4 cm.



Unit Four

Exercise 22

1 [a] P (foul and tamayia) = $\frac{20}{40} = \frac{1}{2}$

[b] P (pies) = $\frac{4}{40} = \frac{1}{10}$

[c] P (cheese and dessert) = $\frac{16}{40} = \frac{2}{5}$

[d] The prediction = $\frac{1}{2} \times 400 = 200$ students

2 [a] (1) P (the student prefers practising Football) = $\frac{44}{100} = \frac{11}{25}$

(2) P (the student prefers practising Handball) = $\frac{27}{100}$

(3) P (the student prefers practising Athletics) = $\frac{12}{100} = \frac{3}{25}$

(4) P (the student prefers practising Tennis) = $\frac{4}{100} = \frac{1}{25}$

(5) P (the student prefers practising Hockey) = $\frac{13}{100}$

[b] The prediction = 78 students.

3 [a] (1) P (the viewer is a viewer of news) = $\frac{20}{200} = \frac{1}{10}$

(2) P (the viewer is a viewer of songs) = $\frac{30}{200} = \frac{3}{20}$

(3) P (the viewer is a viewer of sports) = $\frac{70}{200} = \frac{7}{20}$

(4) P (the viewer is a viewer of series) = $\frac{45}{200} = \frac{9}{40}$

(5) P (the viewer is a viewer of films) = $\frac{35}{200} = \frac{7}{40}$

[b] The prediction = $800 \times \frac{1}{10} = 80$ viewers.

4 [a] P (the student goes to school by bus) = $\frac{15}{40} = \frac{3}{8}$

[b] P (the student goes to school by private car) = $\frac{9}{40}$

The prediction = $800 \times \frac{9}{40} = 180$ students.

5 [a] P (student is getting a score of excellent) = $\frac{6}{50} = \frac{3}{25}$

[b] P (the student is getting a score of very good) = $\frac{9}{50}$

The prediction = $1\,000 \times \frac{9}{50} = 180$ students.

6 P (the student prefer studying German) = $\frac{2}{10} = \frac{1}{5}$

The prediction = $600 \times \frac{1}{5} = 120$ students.

7 P (the tourists from Europe) = $\frac{30}{100} = \frac{3}{10}$

The prediction = $15\,000 \times \frac{3}{10} = 4\,500$ tourists.

8 [a] The number of students prefer countryside = 50 – (12 + 14) = 24 students

P (the student prefer countryside) = $\frac{24}{50} = \frac{12}{25}$

[b] The prediction = $500 \times \frac{12}{25} = 240$ students.

9 [a] P (spinning on any section) = $\frac{1}{6}$

[b] The prediction = $60 \times \frac{1}{6} = 10$ times.

10 P (girls) = $\frac{90}{200} = \frac{9}{20}$

The prediction = $1\,500 \times \frac{9}{20} = 675$ girls.

11 P (red ball) = $\frac{5}{40} = \frac{1}{8}$

The prediction = $400 \times \frac{1}{8} = 50$ balls.

12 P (cleaning) = $\frac{2}{6} = \frac{1}{3}$

The prediction = $30 \times \frac{1}{3} = 10$ times.

13 The number = 2 000 × 0.17 = 340 cows.

14 [a] P (the lamp tear down before 150 working hours) = $\frac{80}{1\,000} = \frac{2}{25}$

[b] P (the lamp tear down after 400 working hours) = $\frac{670}{1\,000} = \frac{67}{100}$

15 The number of students don't read books = 100 – 53 = 47 students.

P (the student don't read books) = $\frac{47}{100}$

The prediction = $400 \times \frac{47}{100} = 188$ students.

16 (1) The total sold number of TV sets from 1st kind = 30 + 42 + 24 + 15 + 40 = 151 TV sets.

The total sold number of TV sets from 2nd kind = 20 + 8 + 26 + 35 + 10 = 99 TV sets.

• then the 1st kind is more requested

• we advise the factory to increase its production from 1st kind

(2) P (production of 1st kind) = $\frac{151}{250}$

The prediction = $3\,000 \times \frac{151}{250}$ = 1 812 TV sets.

17 P (the first player scores a goal) = $\frac{18}{21} = \frac{6}{7} \simeq 0.86$

P (the second player scores a goal) = $\frac{25}{32} \simeq 0.78$

• since 0.86 > 0.78

• then we select the first player because his probability to score a goal is the greater

Exercise 23

1 [a] $\frac{1}{3}$ [b] $\frac{1}{3}$ [c] $\frac{1}{2}$ [d] $\frac{1}{2}$

[e] $\frac{1}{2}$ [f] $\frac{1}{6}$ [g] 0 [h] 1

[i] 0 [j] $\frac{1}{6}$ [k] $\frac{1}{3}$ [l] $\frac{1}{3}$

2 [a] $\frac{1}{2}$ [b] 0 [c] 1 [d] 0

[e] sure [f] $\frac{3}{20}$ [g] $\frac{3}{8}$ [h] $\frac{1}{5}$

[i] $\frac{2}{7}$ [j] $\frac{3}{8}$ [k] $\frac{4}{9}$ [l] $\frac{1}{5}$

[m] $\frac{2}{3}$

3 [a] $\frac{1}{2}$ [b] $\frac{3}{5}$ [c] $\frac{1}{5}$ [d] 0

[e] $\frac{5}{9}$ [f] $\frac{1}{12}$, $\frac{11}{12}$ [g] $\frac{1}{3}$ [h] $\frac{7}{8}$

[i] 0.4 [j] $\frac{2}{5}$

4 [a] P (an odd number) = $\frac{5}{10} = \frac{1}{2}$

[b] P (a prime number) = $\frac{4}{10} = \frac{2}{5}$

[c] P (an even number greater than 6) = $\frac{2}{10} = \frac{1}{5}$

5 [a] P (a number whose tens digit is even) = $\frac{2}{8} = \frac{1}{4}$

[b] P (a number whose units digit is odd) = $\frac{2}{8} = \frac{1}{4}$

[c] P (a number multiple of 4) = $\frac{4}{8} = \frac{1}{2}$

6 [a] P (a prime number) = $\frac{8}{20} = \frac{2}{5}$

[b] P (a number divisible by 7) = $\frac{2}{20} = \frac{1}{10}$

7 [a] P (an even number less than or equal to 4) = $\frac{2}{6} = \frac{1}{3}$

[b] P (a number between 0 and 10) = $\frac{6}{6} = 1$

[c] P (a number divisible by 7) = $\frac{0}{6} = 0$

[d] P (a number is not divisible by 2) = $\frac{3}{6} = \frac{1}{2}$

8 [a] P (the ball is white) = $\frac{3}{15} = \frac{1}{5}$

[b] P (the ball is not red) = $\frac{3+5}{15} = \frac{8}{15}$

9 [a] P (red) = $\frac{3}{6} = \frac{1}{2}$

[b] P (black) = $\frac{0}{6} = 0$

[c] P (green) = $\frac{1}{6}$

10 [a] (1) P (the red colour) = $\frac{1}{8}$

(2) P (the green colour) = $\frac{3}{8}$

(3) P (the yellow colour) = $\frac{4}{8} = \frac{1}{2}$

[b] P (the pointer does not stop at the red colour) = $1 - \frac{1}{8} = \frac{7}{8}$

11 [a] P (a yellow ball) = $\frac{3}{10}$

[b] P (a yellow or red ball) = $\frac{5+3}{10} = \frac{8}{10} = \frac{4}{5}$

[c] P (not a yellow ball) = $\frac{2+5}{10} = \frac{7}{10}$

[d] P (neither red nor yellow) = $\frac{2}{10} = \frac{1}{5}$

12 [a] (1) P (a red ball) = $\frac{6}{10} = \frac{3}{5}$

(2) P (a green ball) = $\frac{4}{10} = \frac{2}{5}$

[b] (1) P (a red ball) = $\frac{5}{9}$

(2) P (a green ball) = $\frac{4}{9}$

13 The number of red balls = $\frac{1}{4} \times 80 = 20$ balls

The number of blue balls = 80 – 20 = 60 balls

14 The number of red balls = $\frac{1}{6} \times 18 = 3$ balls

The number of blue balls = $\frac{1}{3} \times 18 = 6$ balls

The number of green balls = 18 – 3 – 6 = 9 balls

The colour green has the greatest chance to be drawn.

15 The number of girls = 20 girls

The number of boys = 30 boys

P (a boy) = $\frac{30}{50} = \frac{3}{5}$

Test on unit four

1
(1) 1 (2) zero
(3) $\frac{1}{2}$ (4) $\frac{1}{2}$
(5) $\frac{5}{8}$ (6) $\frac{1}{3}$
(7) impossible (8) 0.1
(9) 1 (10) $\frac{2}{5}$
(11) $\frac{1}{3}$ (12) $\frac{2}{5}$
(13) $\frac{8}{9}$ (14) 80

2
(15) zero (16) 1
(17) $\frac{1}{2}$ (18) $\frac{1}{2}$
(19) an event (20) $\frac{2}{5}$
(21) $\frac{\text{number of outcomes of the event}}{\text{number of all possible outcomes}}$
(22) {Head , Tail} , 2

3
(23) [a] $\frac{5}{20} = \frac{1}{4}$ [b] $\frac{15}{20} = \frac{3}{4}$
[c] $\frac{14}{20} = \frac{7}{10}$
(24) [a] $\frac{6}{6} = 1$ [b] $\frac{0}{6} = 0$
[c] $\frac{2}{6} = \frac{1}{3}$ [d] $\frac{3}{6} = \frac{1}{2}$
(25) [a] $\frac{11}{22} = \frac{1}{2}$ [b] $\frac{1}{22}$
[c] $\frac{3}{22}$ [d] $\frac{5}{22}$
(26) [a] $\frac{2}{6} = \frac{1}{3}$ [b] $\frac{1}{6}$
[c] $\frac{0}{6} = 0$

Answers of TIMSS Questions

First :

(1) c (2) c (3) d (4) a (5) d
(6) b (7) c (8) c (9) b (10) d
(11) d (12) b (13) a (14) b (15) a
(16) b (17) b (18) a (19) c (20) b
(21) b (22) d (23) c (24) c (25) c
(26) b (27) c (28) b (29) c (30) a
(31) d (32) a (33) c (34) c (35) a
(36) a (37) c (38) b (39) d (40) b

Second :

(1) The area of the square = 6 × 6 = 36 cm²
The area of the rectangle = 7 × 5 = 35 cm²
The area of the square is greater than the area of the rectangle.

(2) The number of pupils in each class
= 756 ÷ 18 = 42 pupils.

(3) H.C.F. of 12 and 16 = 4
L.C.M. of 12 and 16 = 48

(4) The order is : 2.8 , 3.87 , 3.9 and 4.3

(5) [a] $\frac{1}{2}$ [b] 0 [c] $\frac{2}{3}$ [d] $\frac{1}{2}$



Guide Answers of the Worksheets

Note : The drawn lengths are not real.

First — Worksheets on unit 1 and unit 2

Sheet 1

1. [a] 0.74 [b] 152.302 [c] 2.76
   [d] 3.04 [e] 1.000
2. [a] hundredth [b] hundredth [c] 4.13
   [d] 4 [e] 48
3. [a] 29.821 ≈ 29.82 [b] 8.1054 ≈ 8.105
   [c] 2.355 ≈ 2.36 [d] 0.359 ≈ 0.36
   [e] 13
4. The greatest decimal fraction is 0.5432 ,
   0.5432 ≈ 0.54 (to the nearest hundredth)
   0.5432 ≈ 0.543 (to the nearest thousandth)
5. The sum of lengths of the two pieces of cloth
   = 168.3072 ≈ 168.307 m.

Sheet 2

1. [a] > [b] < [c] >
   [d] < [e] < [f] >
2. [a] (1) The order is : $\frac{1}{4}$, $\frac{2}{5}$, $\frac{1}{2}$ and $\frac{7}{10}$
   (2) The order is : $1\frac{1}{2}$, 2.4 , $2\frac{1}{2}$ and $3\frac{4}{5}$
   [b] (1) The order is : 1 , $\frac{7}{8}$, $\frac{1}{2}$ and $\frac{2}{5}$
   (2) The order is : 0.8 , $\frac{3}{4}$, $\frac{1}{2}$, 0.4 and $\frac{1}{4}$
3. [a] 37.26 [b] 9
   [c] thousandth [d] 9 [e] 0.01
4. x = 8 or 7 or 6 or 5 or 4
5. The smallest decimal fraction is 0.2349 ,
   0.2349 ≈ 0.235 (to the nearest thousandth)

Sheet 3

1. [a] 3256.3 [b] 25.083 [c] 7003
   [d] 9 [e] 4.63
2. [a] > [b] = [c] 6
   [d] hundredth [e] 100
3. [a] ✗ [b] ✓ [c] ✓
   [d] ✗ [e] ✗
4. The price of pieces = 2.25 × 10 = 22.5 pounds
5. [a] (1) 406.1 (2) 741.8
   [b] The order is : 4.025 , $4\frac{1}{8}$, $4\frac{1}{4}$ and 4.375

Sheet 4

1. [a] 37.1 [b] 1.44 [c] 0.042
   [d] 17.28 [e] 0.714
2. [a] 0.0092 [b] tenth [c] >
   [d] = [e] 426.31
3. [a] 3.561 [b] 20.132 ≈ 20.13
   [c] 26.85 ≈ 26.9 [d] 73
   [e] 16.9329 ≈ 16.933
4. The area of the rectangle = 2.4 × 4.5
   = 10.8 cm^2 ≈ 11 cm^2
5. The price of cloth = 2.25 × 7.75
   = 17.4375 ≈ 17 pounds.

Sheet 5

1. [a] $\frac{2}{5}$ [b] 10 [c] $15\frac{3}{10}$
   [d] 1.75 [e] 3 759
2. [a] 38 623 [b] $\frac{9}{8}$ [c] <
   [d] 93.499 [e] 7

3. [a] $\frac{14}{5} = 2\frac{4}{5}$ [b] 26.048 [c] 3 500
   [d] 2.38 [e] 1
4. [a] The order is : 1 , $\frac{7}{8}$, $\frac{1}{2}$ and $\frac{2}{5}$
   [b] (1) < (2) <
5. The price of bars = $2\frac{3}{4}$ × 15 = 41.25 pounds.

Sheet 6

1. [a] 2 [b] $\frac{4}{7}$ [c] 18
   [d] $\frac{7}{2} = 3\frac{1}{2}$ [e] $\frac{1}{2}$
2. [a] > [b] > [c] =
   [d] < [e] =
3. [a] 23.38 [b] 256 [c] 2.53
   [d] $\frac{1}{9}$ [e] $\frac{2}{15}$
4. The side length = $\frac{8}{11} \div 4 = \frac{2}{11}$ m.
5. The price of the cloth = 4.2 × 48.7
   = 204.54 ≈ 205 pounds.

Sheet 7

1. [a] 0.84 [b] 0.036 [c] 2.4568
   [d] 0.3725 [e] 6
2. [a] 1 000 [b] < [c] >
   [d] $\frac{3}{4}$ [e] 6
3. The order is : $\frac{5}{12}$, $\frac{2}{3}$, $\frac{3}{4}$, $\frac{5}{6}$ and $\frac{11}{12}$
4. The length of the road = 64 983 ÷ 1 000
   ≈ 64.98 km.
5. The share of each one = 565.5 ÷ 10
   = L.E. 56.55

Sheet 8

1. [a] 32 [b] 24 [c] 78
2. [a] 28 [b] = [c] <
   [d] 8 [e] 56
3. [a] 14.67 [b] 3 200 [c] 15
   [d] 0.0485 [e] 0.75351
4. The number of trips = 19 440 ÷ 162
   = 120 trips.
5. [a] Ahmed paid = 12 × 1.85 = 22.2 pounds.
   [b] The order is : $\frac{2}{5}$, 0.5 , 0.6 and $\frac{5}{8}$

Sheet 9

1. [a] 41 [b] 32 [c] 14
   [d] 7463.2 [e] 58.546 ≈ 58.55
2. [a] 84.6 [b] > [c] =
   [d] 14 [e] 109
3. The number of parts = 53.55 ÷ 3.15 = 17 parts.
4. The number = 1.248 ÷ 0.52 = 2.4
5. The area = 13.25 × 6.14 = 81.355 ≈ 81.36 cm^2

Sheet 10

1. [a] 2.8 [b] 3.29 [c] 4.23 [d] 13.7
2. [a] $\frac{1}{2}$ [b] 15.7 [c] 6
   [d] < [e] 13
3. [a] 6 [b] 0.2 [c] $\frac{49}{27}$
   [d] 84 [e] 453.37
4. The order is : $3\frac{1}{8}$, $3\frac{2}{5}$, $3\frac{1}{2}$, $3\frac{3}{4}$ and $4\frac{1}{4}$
5. The family pays = 38.5 × 6.5 = L.E. 250.25
   ≈ L.E. 250

Sheet 11

1. [a] set [b] set [c] not set
   [d] not set [e] set
2. [a] The elements are : 7 , 4 , 5 , 8 and 1
   [b] The elements are : s , t , u , d , e and n
   [c] The elements are : 6 , 7 , 8 and 9
   [d] The elements are : 0 , 2 , 4 , 6 and 8
   [e] The elements are : 1 , 2 , 3 and 6
3. [a] 10 [b] 4533.4 [c] 101
   [d] 72.36 [e] 37.44
4. The height of the building = 3.05 × 7
   = 21.35 metres.
5. The order is : $\frac{4}{5}$, $\frac{3}{4}$, $\frac{1}{2}$, 0.4 and $\frac{1}{4}$

Sheet 12

1. [a] A = {Saturday , Sunday , Monday , Tuesday , Wednesday , Thursday , Friday}
   [b] B = {3 , 2} [c] C = {d , o , r}
   [d] D = {2 , 3 , 5 , 7}
   [e] E = {8 , 10 , 12 , 14 , 16}
2. [a] A = The set of governorates on the Suez Canal
   [b] B = The set of digits of the number 531
   [c] C = The set of prime numbers between 10 and 18
   [d] D = The set of whole numbers between 8 and 13
   [e] E = The set of letters of the word "goal"
3. [a] {1 , 2 , 3 , 4 , 5}
   [b] {3 , 4 , 6 , 7} [c] {4 , 5 , 6 , 8}
   [d] {3 , 4} [e] {4}
4. [a] 6 [b] 257.6 [c] 5
   [d] 0.738 [e] $\frac{14}{5} = 2\frac{4}{5}$
5. The price of pieces
   = 4.35 × 35 = 152.25 pounds.

Sheet 13

1. [a] ∈ , ∈ [b] ∈ , ∉ [c] ∉ , ∈
   [d] ∈ , ∈ [e] ∉ , ∉
2. [a] empty [b] finite [c] infinite
   [d] finite [e] empty
3. [a] $\frac{2}{9}$ [b] >
   [c] 3.2 [d] 28.932
4. [a] 3 [b] 1
   [c] 9 [d] 5.63
5. The perimeter = (4.1 + 3.5) × 2 = 15.2 cm.
   The area = 4.1 × 3.5 = 14.35 cm^2

Sheet 14

1. [a] ⊂ [b] ∈ [c] ⊂
   [d] ∉ [e] ⊂ [f] ⊄
   [g] ⊂ [h] ⊄
2. [a] ∅ , {5} , {7} , {5 , 7}
   [b] ∅ , {3} , {4} , {8} , {3 , 4} , {3 , 8} , {4 , 8} , {3 , 4 , 8}
3. [a] 3 [b] 5.2 [c] 3
   [d] 7 [e] 3
4. [a] ⊄ [b] ∉ [c] ⊂
   [d] 1.3542 [e] an infinite
5. The number of hours = $8\frac{3}{4} + 2\frac{1}{2}$
   = $3\frac{1}{2}$ hours.

Sheet 15

1. [a] {3} [b] {6 , 7}
   [c] ∅ [d] {9}
2. [a] {2} [b] ∅ [c] ∅
   [d] 7 [e] 32.15 = 32
3. [a] 635.2 [b] 0.108 [c] ∉
   [d] ∈ [e] ⊄
4. [a] $\frac{1}{2}$ [b] 621.7
   [c] 54 [d] 0.2
5. The number of poor people
   = 565.5 ÷ 6.5 = 87 persons.

Sheet 16

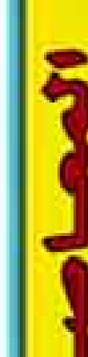
1. [a] {1 , 4 , 5 , 7}
   [b] {3 , 4 , 5 , 6}
   [c] {2 , 5 , 6 , 7}
   [d] {1 , 4 , 5 , 7 , 3 , 6}
   [e] {1 , 2 , 4 , 5 , 6 , 7}
   [f] {2 , 3 , 4 , 5 , 6 , 7}
   [g] {1 , 2 , 3 , 4 , 5 , 6 , 7} [h] {5}
2. [a] ⊂ [b] 25 [c] 20.38
   [d] ⊂ [e] X
3. [a] 4 [b] {3 , 4 , 5} [c] 3 560
   [d] 0.27 [e] 7.5381
4. [a] 12
   [b] The order is : $\frac{3}{8}$, 0.6 , $\frac{3}{4}$ and 0.8
5. The price of apples = 9.75 × 2.5
   = 24.375 pounds.

Sheet 17

1. [a] {1 , 2 , 3 , 4 , 5 , 6 , 8}
   [b] {2 , 5} [c] {1 , 2 , 3 , 4 , 5}
   [d] {3 , 6 , 8} [e] {1 , 4 , 6 , 8}
2. [a] A` = {5 , 4 , 6}
   [b] B` = {1 , 4 , 6}
   [c] A ∩ B = {2 , 3}
   [d] A ∪ B = {1 , 2 , 3 , 5}
   U, A, B, ·1, ·2, ·3, ·5, ·4, ·6
3. [a] ∉ [b] ⊄ [c] ∉ [d] ⊄
4. [a] 1.17 [b] $3\frac{3}{4}$ [c] {gh} [d] {5}
5. [a] 9375.2 [b] 10.758
   [c] $2\frac{2}{5}$ [d] 0.3856

Sheet 18

1. [a] {8} [b] {1 , 3 , 7 , 8}
   [c] {1 , 7} [d] {3}
   [e] {3 , 9} [f] {1 , 7 , 9}
2. [a] {6} [b] {2 , 5 , 6 , 7 , 8 , 9}
   [c] {2 , 9} [d] {2 , 5 , 7 , 8 , 9 , 10}
   [e] {1 , 2 , 3 , 5 , 6 , 7 , 8 , 9}
3. [a] {2 , 3 , 4} [b] 5 [c] {2 , 5}
   [d] ∅ [e] 540
4. [a] ⊂ [b] 1 [c] 6
   [d] 1.023 [e] 4
5. The number of bottles = $131\frac{1}{4} \div 5\frac{1}{4}$
   = 25 bottles.





Second Worksheets on unit 3 and unit 4

Sheet 1

1 [a] diameter [b] chord
[c] radius [d] M

2 [a] diameter [b] equal in length
[c] 14 [e] diameter

3 Draw by yourself.

4 Draw by yourself.

5

The length of $\overline{AC}$ = 8 cm.

Sheet 2

1 [a]

[b]

2 [a]

[b] (1) chord (2) 5

3 [a]

[b]

The length of $\overline{BC}$ = 8 cm.

4 [a]

Δ XYZ is a right-angled triangle.

[b] EN = NM = ME = 6 cm.

The perimeter of Δ MEN = 6 + 6 + 6
= 18 cm.

5 [a] The side length of the triangle.
= 12 ÷ 3 = 4 cm.

[b] (1) $\overline{AB}$
(2) ABM

Sheet 3

1

2

The length of $\overline{BD}$ = 3 cm.

Answers of the Worksheets

3

[a] m (∠ CAD) = 30°

[b] The length of $\overline{BD}$ = 2 cm.

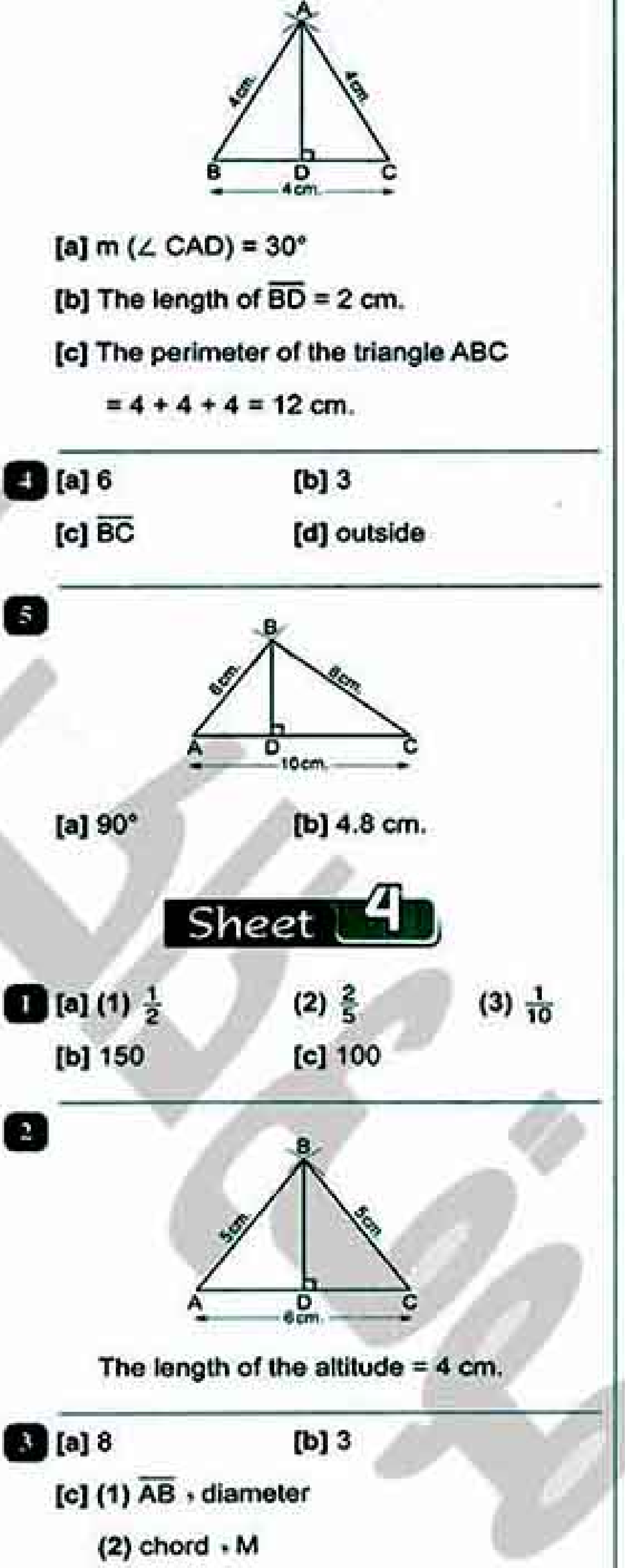
[c] The perimeter of the triangle ABC
= 4 + 4 + 4 = 12 cm.

4 [a] 6 [b] 3
[c] $\overline{BC}$ [d] outside

5

[a] 90° [b] 4.8 cm.

Sheet 4



1 [a] (1) $\frac{1}{2}$ (2) $\frac{2}{5}$ (3) $\frac{1}{10}$
[b] 150 [c] 100

2

The length of the altitude = 4 cm.

3 [a] 8 [b] 3
[c] (1) $\overline{AB}$ ، diameter
(2) chord ، M

4

The lenght of $\overline{AB}$ = 5 cm.

5

The perimeter of Δ ABC = 3 + 3 + 3 = 9 cm.

Sheet 5

1 [a] $\frac{1}{4}$ [b] $\frac{5}{12}$
[c] $\frac{7}{12}$ [d] $\frac{8}{12} = \frac{2}{3}$

2 [a] 1 [b] diameter
[c] 3 [d] $\frac{1}{2}$

3 [a] impossible [b] $\frac{1}{3}$
[c] $\frac{1}{2}$ [d] 0

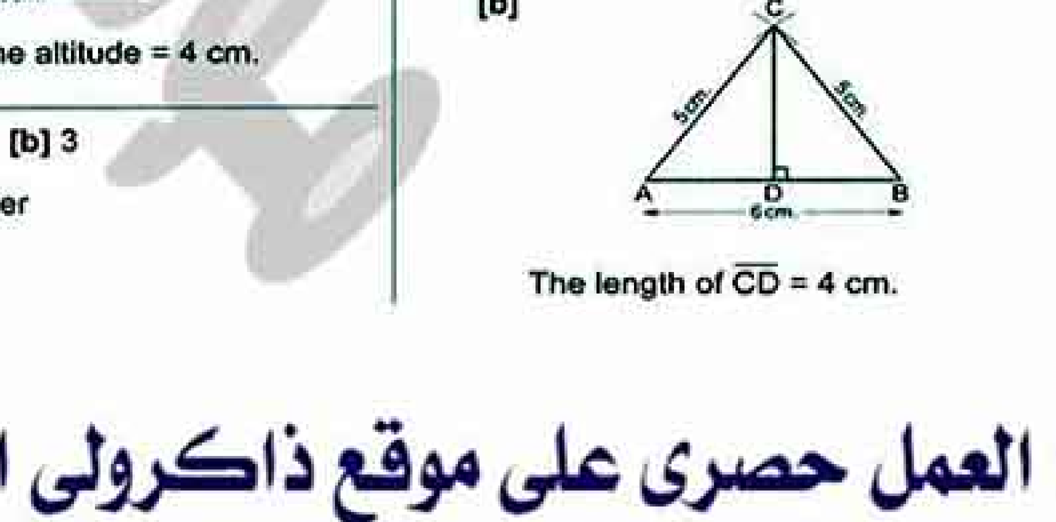
4 [a] $\frac{1}{2}$ [b] $\frac{2}{5}$ [c] $\frac{2}{5}$ [d] $\frac{3}{10}$

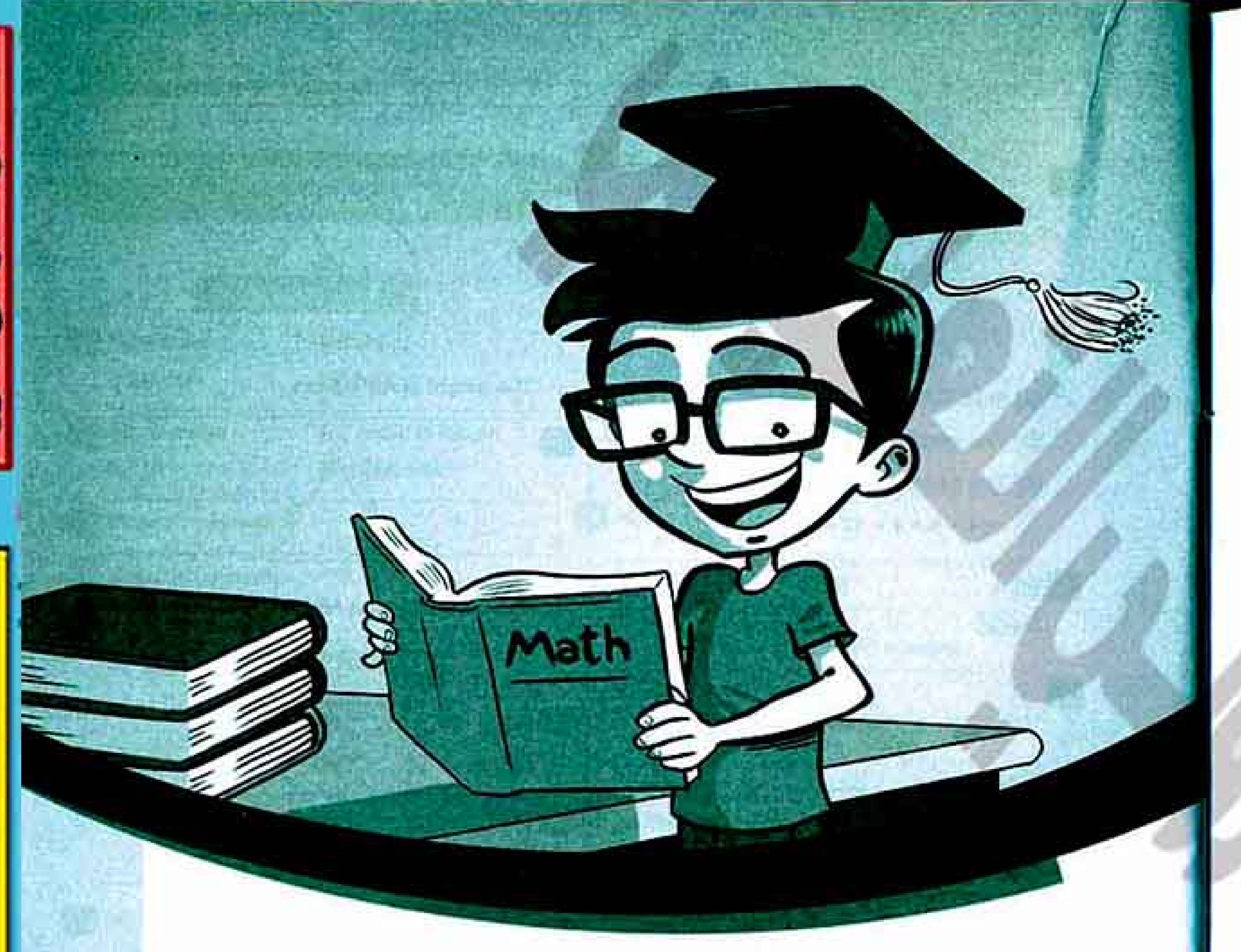
5 [a]

m (∠ A) = 30°

[b]

The length of $\overline{CD}$ = 4 cm.





Guide Answers of Final Examinations

Note : The drawn lengths are not real.

Answers of Models of the School Book

Model 1

1

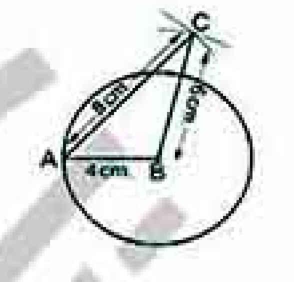
(1) right-angled triangle	(2) 11
(3) 3	(4) 3750
(5) >	(6) X ∩ Y
(7) >	(8) $\frac{3}{2}$
(9) 6	(10) diameter
(11) ⊄	(12) 100
(13) ∉	(14) >

2

(15) [a] MB , MC [b] $\overline{AB}$

(16) $\frac{2}{3}$	(17) 1	(18) 5
(19) 24	(20) {6 , 8}	
(21) 0.384	(22) $\frac{9}{50}$	

3 (23)



(24) $\frac{40}{100} = \frac{2}{5}$

(25) The order is : $6\frac{1}{4}$, $5\frac{3}{4}$, $5\frac{1}{2}$ and $5\frac{2}{5}$

(26) The side length of the square = 3 + 3 = 6 cm.

The perimeter of the square = 6 × 4 = 24 cm.

Model 2

1

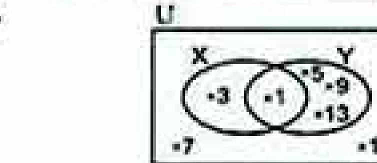
(1) 3360	(2) 9.1
(3) $\frac{5}{7}$	(4) >
(5) 0.111	(6) =
(7) 0.3	(8) X ∪ Y
(9) ⊄	(10) 5

(11) >	(12) 3
(13) $\frac{3}{8}$	(14) $\frac{1}{2}$

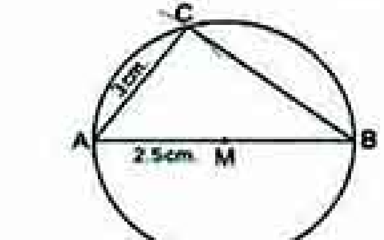
2

(15) $\frac{2}{10}$	(16) X
(17) $\overline{AB}$	(18) X − Y
(19) 2	(20) 4.680
(21) $\frac{4}{9}$	(22) 1000

3 (23) X ∩ Y = {1}



(24)

The length of $\overline{BC}$ = 4 cm.

(25) $\frac{5}{20} = \frac{1}{4}$

(26) The area of the rectangle = 4.1 × 3.5 = 14.35 cm^2

Model for the special needs students

1

(1) $\frac{1}{4}$	(2) 3
(3) 31.2	(4) X ∪ Y
(5) diameter	(6) =
(7) 3	(8) ⊂
(9) $\frac{1}{2}$	(10) 0.5

2

(1) 4.9	(2) $\frac{1}{6}$
(3) 12.1	(4) 2
(5) {1 , 5}	

3

(1) X ∩ Y	(2) >
(3) 4.3	(4) $\frac{1}{2}$
(5) altitude	

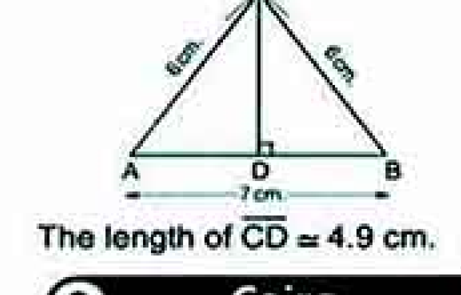
Answers of Schools' Examinations

1 Cairo

1
(1) 425 (2) 4 (3) 3
(4) 0.01 (5) 3 (6) $\frac{5}{7}$
(7) > (8) $\frac{2}{7}$ (9) X
(10) $\notin$ (11) $\subset$ (12) diameter
(13) $\frac{3}{5}$ (14) 2

2
(15) 10 (16) 136.454 , 136.5
(17) 5 (18) outside (19) 9
(20) radius (21) zero (22) 72

3
(23) [a] $\frac{8}{20} = \frac{2}{5}$ [b] $\frac{0}{20} = 0$
[c] $\frac{13}{20}$ [d] $\frac{15}{20} = \frac{3}{4}$
(24) [a] $\{3\}$ [b] $\{1 , 2 , 3 , 4\}$
[c] $\{1 , 2\}$ [d] $\{1 , 2 , 5\}$
(25) [a] 28 [b] 0.714
(26)



The length of $\overline{CD} \simeq 4.9$ cm.

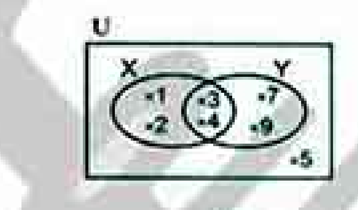
2 Cairo

1
(1) 3 (2) $\not\subset$ (3) 3
(4) a diameter (5) $\not\subset$ (6) $\frac{7}{5}$
(7) 9.1 (8) Y − X (9) 11
(10) > (11) = (12) 50

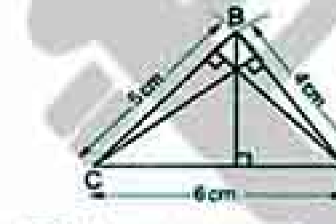
2
(13) X (14) $\{3 , 5\}$ (15) 17
(16) 10 (17) $\frac{2}{10}$ (18) outside it
(19) 616 (20) 5 , 4 (21) 0.27
(22) 5 cm.

3
(23) [a] $\frac{5}{15} = \frac{1}{3}$ [b] $\frac{10}{15} = \frac{2}{3}$
(24) The cost = 6.45 × 2.4 = L.E. 15.48

(25)



(26)



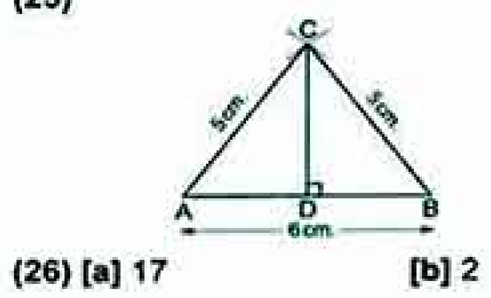
$\triangle$ ABC is a scalene triangle.

3 Cairo

1
(1) 69.554 , 69.55 (2) 4 (3) 3
(4) $\{1 , 3 , 4 , 5\}$ (5) 7
(6) a diameter (7) 12.3 (8) 0

2
(9) 3 (10) 2 × r (11) X
(12) $\subset$ (13) $\in$ (14) an infinite
(15) $\subset$ (16) 2 (17) 1.5
(18) < (19) 0.24 (20) 7.105
(21) $\frac{1}{10}$ (22) =

3
(23) [a] $\frac{6}{12} = \frac{1}{2}$ [b] $\frac{9}{12} = \frac{3}{4}$
(24) [a] $\{1 , 2 , 3 , 5 , 9\}$ [b] $\{3\}$
[c] $\{5 , 9\}$
[d] $\{4 , 6 , 5 , 9\}$
(25)



(26) [a] 17 [b] 2

4 Cairo

1
(1) $\frac{7}{3}$ (2) $\{5\}$ (3) 108.083 , 108.08
(4) 5 (5) X (6) a diameter
(7) zero (8) the vertex of the right angle
(9) 1 (10) 85.25 m^2

2
(11) 7 (12) 3 (13) =
(14) $\subset$ (15) 13.5 (16) 0.111
(17) $\frac{1}{2}$ (18) $\{1 , 2 , 3\}$

3
(19) The order is : 0.8 , $\frac{1}{2}$, 0.4 and $\frac{1}{4}$
(20) 48 (21) 11.05 (22) 101
(23) $\{2 , 8\}$
(24)

(25) X ∩ Y = $\{1 , 5\}$
X − Y = $\{3\}$
Ý = $\{3 , 7 , 11\}$
(26) [a] $\frac{0}{6} = 0$ [b] $\frac{3}{6} = \frac{1}{2}$

5 Giza

1
(1) 5.04 (2) X (3) 0
(4) an infinite (5) 0.325 (6) 4
(7) 32750 (8) = (9) $\frac{1}{2}$
(10) 1 (11) $\frac{1}{2}$ (12) ≤
(13) $\subset$ (14) 5

2
(15) disjoint (16) 29.21 , 29.2 (17) $\frac{2}{7}$
(18) $\frac{5}{7}$ (19) a radius (20) 100
(21) 5 (22) 90

3
(23) 34
(24) The order is : 0.2 , $\frac{1}{2}$, $3\frac{1}{4}$ and $7\frac{1}{8}$
(25) [a] $\frac{5}{10} = \frac{1}{2}$ [b] $\frac{0}{10} = 0$
[c] $\frac{7}{10}$ [d] $\frac{3}{10}$
(26)

The length of $\overline{CD} \simeq 3.6$ cm.

6 Giza

1
(1) 4 (2) 0.65 (3) $\overline{AB}$
(4) 12.25 (5) X (6) 138.33
(7) 7 (8) 5 (9) 10
(10) $\frac{2}{3}$ (11) 30 (12) 2
(13) diameter (14) $\frac{2}{9}$

2
(15) 0 (16) 21.75 (17) 0.8597
(18) $\varnothing$ (19) $\{4\}$ (20) 3
(21) 180 (22) 6250

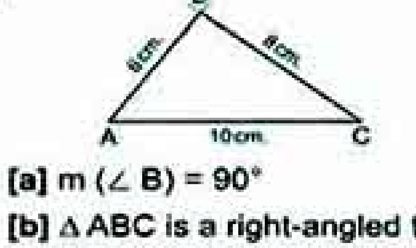
3
(23) [a] $\{1\}$ [b] $\{3 , 4 , 5\}$
(24) [a] The length of $\overline{BC} \simeq 6.2$ cm.
[b] m ($\angle$ C) = 90°
(25) [a] $\frac{6}{19}$ [b] $\frac{15}{19}$
(26) The price = 39.8 × 8.5 = 338.3 ≃ L.E. 338

7 Alexandria

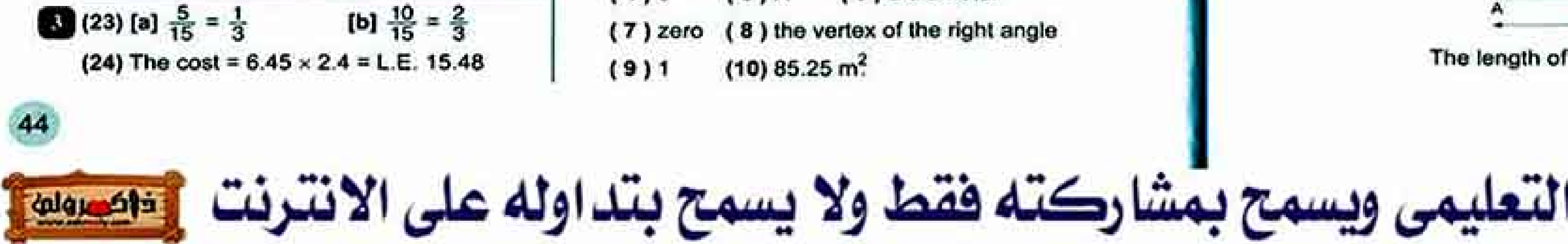
1
(1) 18 (2) $\notin$ (3) $\subset$
(4) 3 (5) 4750 (6) $\frac{1}{2}$
(7) 3 (8) 36.76 (9) Y − X
(10) < (11) 1 (12) A
(13) 8 (14) <

2
(15) equal in length (16) 6
(17) outside (18) $\{2\}$ (19) 64.14
(20) 8.9642 (21) 1.5525 (22) 2

3
(23) [a] $\{6 , 8\}$ [b] $\{2 , 3 , 6 , 8 , 4 , 5\}$
[c] $\{4 , 5\}$ [d] $\{3 , 2 , 1 , 7\}$
(24) [a] $\frac{5}{11}$ [b] $\frac{11}{11} = 1$
(25) [a] a diameter [b] a chord
(26)



[a] m ($\angle$ B) = 90°
[b] $\triangle$ ABC is a right-angled triangle.

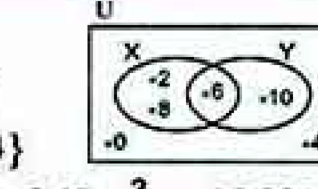


8 Alexandria

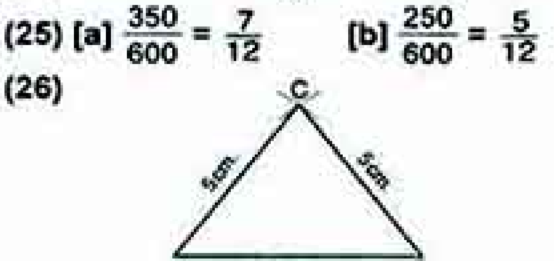
1
(1) 0.8482 (2) $\frac{2}{7}$ (3) 865.7
(4) < (5) 33510 (6) ⊂
(7) 8 (8) an acute (9) ∉
(10) 6.5 (11) ∅ (12) 3
(13) 3.8 (14) >

2
(15) the intersection (16) $\frac{1}{2}$
(17) 42.25 (18) 20 (19) inside
(20) {10 , 12} (21) $\frac{6}{5} = 1\frac{1}{5}$ (22) a chord

3
(23) X ∩ Y = {6}
X̀ = {0 , 4 , 10}
Ỳ = {2 , 8 , 0 , 4}



(24) The order is : $\frac{3}{4}$, 0.45 , $\frac{3}{8}$ and 0.225
(25) [a] $\frac{350}{600} = \frac{7}{12}$ [b] $\frac{250}{600} = \frac{5}{12}$
(26)



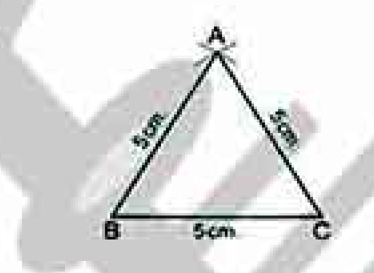
9 El-Kalyoubia

1
(1) ∈ (2) 3750 (3) 0.25
(4) 9.6 (5) 6 (6) 1
(7) = (8) ⊂ (9) 52.91
(10) ∅ (11) $\frac{7}{10}$ (12) 1
(13) 3 (14) 6

2
(15) {3 , 5 , 7} (16) 0.528 (17) $\frac{1}{6}$
(18) 3002 (19) 3.1 (20) 28

3
(21) [a] {1 , 2 , 3 , 4 , 5} [b] {3 , 4 , 5}
(22) 8
(23) ∅ , {3} , {7} and {3 , 7}
(24) X ∪ Y = {3 , 4 , 5 , 6}
X − Y = {3 , 4}
(25) $\frac{3}{10}$

(26)



10 El-Sharkia

1
(1) 375 (2) > (3) ⊂
(4) $\frac{1}{2}$ (5) 1 (6) 3
(7) ∅ (8) 3360 (9) 6
(10) 3 (11) diameter (12) 12.1
(13) X ∩ Y (14) 31.2

2
(15) X (16) 1 (17) 1.68
(18) 4.68 (19) 5 (20) $\frac{4}{5}$
(21) 2 (22) 2 , 1

3
(23) The weight = 5904 ÷ 492 = 12 kg.
(24) [a] {1 , 2 , 4 , 5} [b] {5}
[c] {1 , 2} [d] {4 , 3 , 6}
(25) $\frac{5}{15} = \frac{1}{3}$
(26)



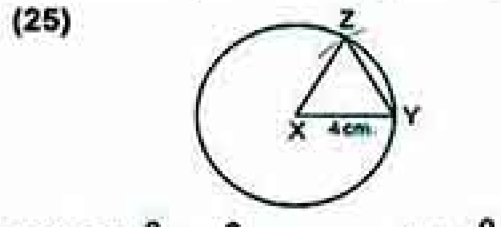
AB = 6 cm.

11 El-Monofia

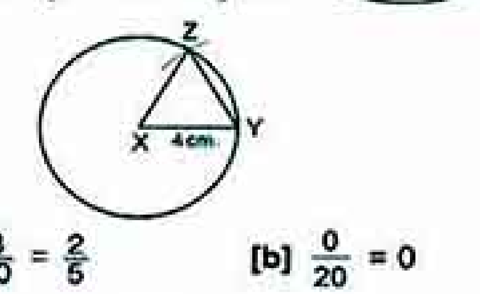
1
(1) 6 (2) 4 (3) $\frac{1}{6}$
(4) ∅ (5) 276.533 (6) $\frac{2}{9}$
(7) 3 (8) ⊄ (9) ∉
(10) 5 (11) 6 (12) outside
(13) 6 (14) 10.9

2
(15) 100.00 (16) 5400 (17) $\frac{1}{12}$
(18) Y , X (19) 3
(20) diameter (21) 101 (22) 3750

3
(23) The order is : $\frac{1}{4}$, 0.4 , $\frac{1}{2}$, $\frac{3}{4}$ and 0.8
(24) A ∩ B = {2 , 3} = B
A ∪ B = {1 , 6 , 2 , 3} = A



(25)



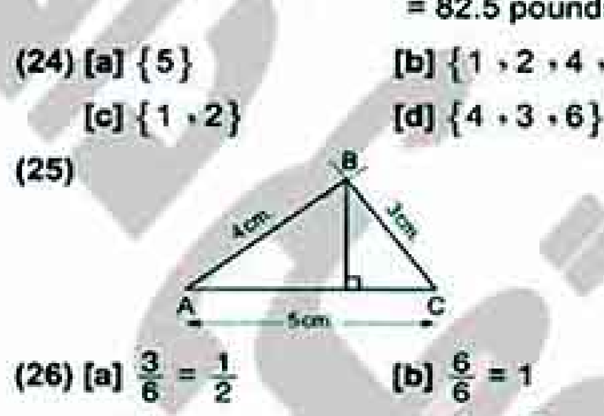
(26) [a] $\frac{8}{20} = \frac{2}{5}$ [b] $\frac{0}{20} = 0$

12 El-Gharbia

1
(1) = (2) 0.357 (3) diameter
(4) ⊂ (5) $\frac{3}{7}$ (6) ∅
(7) 25 (8) > (9) 24.64
(10) {7} (11) A (12) 3
(13) 5 (14) Y

2
(15) 6 (16) 3560 (17) {2}
(18) 10 (19) 0 (20) 1
(21) 3 (22) 10.9

3
(23) The price of 3 metres = 27.5 × 3
= 82.5 pounds.
(24) [a] {5} [b] {1 , 2 , 4 , 5}
[c] {1 , 2} [d] {4 , 3 , 6}
(25)



(26) [a] $\frac{3}{6} = \frac{1}{2}$ [b] $\frac{6}{6} = 1$
[c] $\frac{1}{6}$ [d] $\frac{4}{6} = \frac{2}{3}$

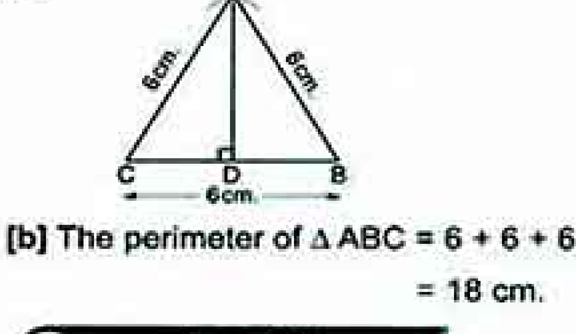
13 El-Dakahlia

1
(1) 1.5 (2) 16 (3) 0.5 (4) ⊂
(5) 0.2 (6) 6 (7) 10

2
(8) 1 (9) X (10) 3 (11) 5
(12) 0.1 (13) 0.15

3
(14) X (15) 6 (16) $\frac{7}{8}$
(17) radius (18) ⊄ (19) ∅
(20) <

4
(21) [a] {1 , 2 , 3 , 6 , 7} [b] {2}
[c] {6 , 7} [d] {4 , 5}
(22) [a] $\frac{3}{12} = \frac{1}{4}$ [b] $\frac{9}{12} = \frac{3}{4}$
[c] $\frac{7}{12}$ [d] $\frac{0}{12} = 0$
(23) 2.4
(24) The total price = 35 × 7.5
= 262.5 ≈ 263 pounds.
(25) [a]



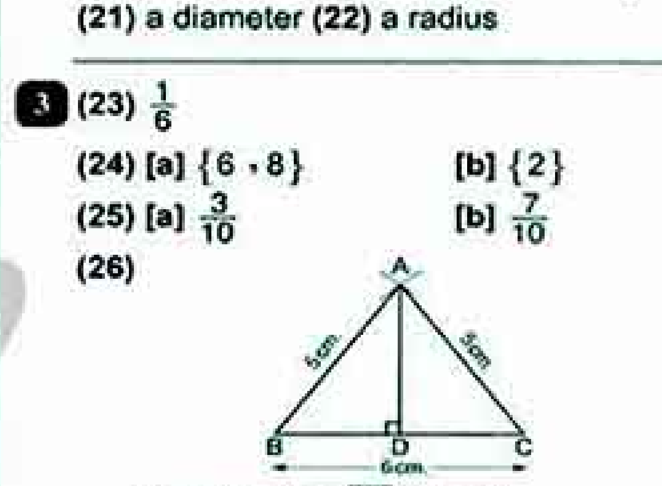
[b] The perimeter of Δ ABC = 6 + 6 + 6
= 18 cm.

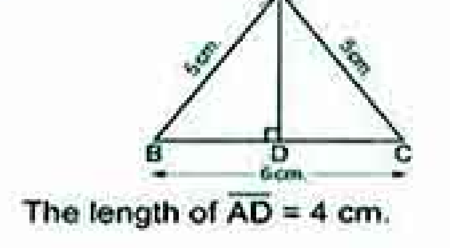
14 Ismailia

1
(1) < (2) 1 (3) 3
(4) ⊂ (5) ✓ (6) X
(7) 3 (8) 7 (9) $\frac{1}{5}$
(10) 3 (11) 6800 (12) 10
(13) $\frac{2}{3}$ (14) 8

2
(15) 2830 (16) 6.373 (17) 0.736
(18) 6.38 (19) {0 , 2} (20) $\frac{7}{9}$
(21) a diameter (22) a radius

3
(23) $\frac{1}{6}$
(24) [a] {6 , 8} [b] {2}
(25) [a] $\frac{3}{10}$ [b] $\frac{7}{10}$
(26)



The length of $\overline{AD}$ = 4 cm.

15 Suez

1 (1) = (2) 6 (3) ∉
(4) 3 (5) diameter (6) 5
(7) 18.17 (8) 276.53 (9) Y
(10) 4 (11) 1 (12) 0.25
(13) 6 (14) Y – X

2 (15) 3750 (16) 18 (17) {4}
(18) {1 , 3 , 5} (19) 6
(20) 40 (21) 5 (22) $\frac{1}{2}$

3 (23) The order is : 3.125 , $3\frac{1}{4}$, 3.3 and $3\frac{1}{2}$
(24) [a] {3} [b] {3 , 4 , 5}
(25) [a] $\frac{0}{6} = 0$ [b] $\frac{1}{6}$
(26)

16 Damietta

1 (1) 25.675 (2) 3526.94 (3) an infinite
(4) a diameter (5) > (6) 11
(7) 5 (8) 0.25 (9) 0.02321
(10) 0.027 (11) ⊂ (12) ∈
(13) 4 (14) outside

2 (15) 1 (16) $\frac{5}{4}$ (17) 0.63
(18) $\frac{1}{4}$ (19) 4 (20) {1 , 2}
(21) 3 (22) 3 cm.

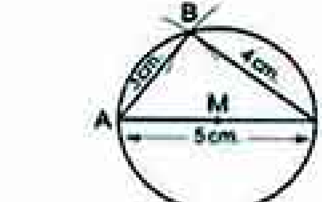
3 (23) The weight = 5405 ÷ 235 = 23 kg.
(24) [a] {7 , 8} [b] {5 , 6}
(25) [a] $\frac{5}{20} = \frac{1}{4}$ [b] $\frac{15}{20} = \frac{3}{4}$
(26)

17 Kafr El-Sheikh

1 (1) 0.27 (2) 1 (3) 24
(4) 4 (5) $\frac{3}{2}$ (6) a diameter
(7) 9 (8) ∅

2 (9) 11 (10) ⊄ (11) 3 (12) $\frac{3}{8}$
(13) > (14) 8 (15) ⊂ (16) 3
(17) 6 (18) ∉ (19) 0.5 (20) 24
(21) 160 (22) 3

3 (23) The width = 10.25 ÷ 4.1 = 2.5 m.
The perimeter = (4.1 + 2.5) × 2 = 13.2 m.
(24) [a] {1 , 5 , 8 , 4 , 6} [b] {5 , 8}
[c] {6} [d] {1 , 3}
(25) The order is : $\frac{2}{5}$, 0.6 , $\frac{3}{4}$ and 0.8
(26)



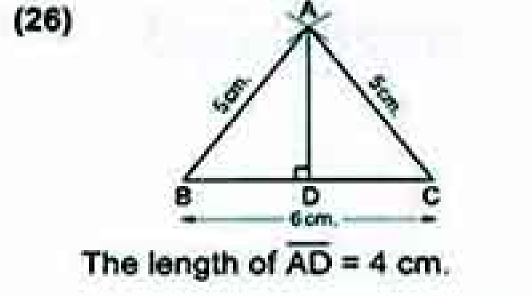
18 El-Beheira

1 (1) X ∩ Y (2) 3 (3) 3750
(4) 24 (5) ⊄ (6) 3.13
(7) 3 (8) > (9) diameter
(10) 11 (11) 67 (12) 0.17
(13) 212.5 (14) 2

2 (15) X (16) {8 , 9} (17) $\frac{1}{2}$
(18) 4.679 (19) an altitude of Δ ABC
(20) 12 (21) 6 (22) $\frac{5}{4}$

3 (23) [a] {2 , 3} [b] {6 , 8 , 4 , 5}
(24) [a] $\frac{5}{20} = \frac{1}{4}$ [b] $\frac{14}{20} = \frac{7}{10}$
(25) The number of times = 4375 ÷ 125
= 35 times.

(26)



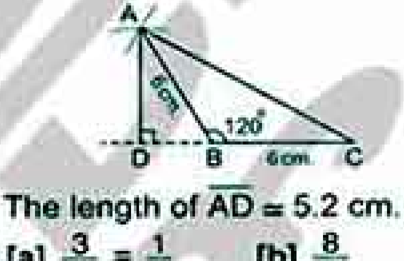
The length of $\overline{AD}$ = 4 cm.

19 Beni Suef

1 (1) zero (2) 3 (3) X
(4) 0.01 (5) 3 (6) 6
(7) 17.95 (8) ⊄ (9) 9530
(10) $\frac{1}{3}$ (11) 0.17 (12) 11
(13) a diameter (14) 0.25

2 (15) 6 (16) 7.105
(17) the centre (18) 78.88 , 78.9
(19) {2 , 3 , 6} (20) 3

3 (21) 2.5428 , 2.543 (22) 1 (23) 7.885
(24) 32
(25) The number = 33.86 ÷ 0.5 = 67.72
(26) [a] {3} [b] {1 , 2 , 3 , 4}
[c] {1 , 2} [d] {1 , 2 , 5}
(27)



The length of $\overline{AD}$ = 5.2 cm.
(28) [a] $\frac{3}{15} = \frac{1}{5}$ [b] $\frac{8}{15}$
(29) The covered distance = 24.73 × $2\frac{1}{2}$
= 61.825 km.
(30) $\frac{1}{2}$

20 El-Menia

1 (1) > (2) X (3) ⊂
(4) diameter (5) ∅ (6) 3
(7) 31.2 (8) $\frac{1}{2}$ (9) X ∩ Y
(10) 1 (11) 0.06 (12) tenth
(13) 1 (14) >

2 (15) 6 (16) 3002 (17) 4
(18) 69.554 , 69.55 (19) $\frac{2}{3}$
(20) 5 (21) 9 (22) 8.8

3 (23)

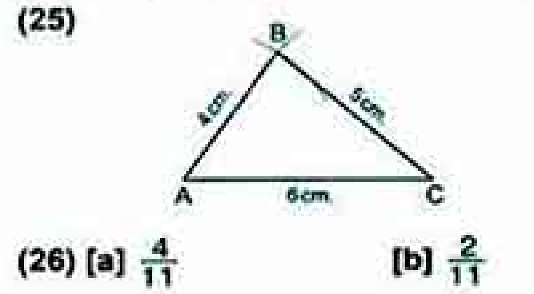
The length of the altitude from C = 4.9 cm.
(24) [a] {1 , 2 , 3 , 4 , 8 , 9}
[b] {1 , 2} [c] {3} [d] {5}
(25) The order is : $\frac{1}{2}$, 0.6 , $\frac{3}{4}$ and 0.8
(26) [a] $\frac{5}{20} = \frac{1}{4}$ [b] $\frac{9}{20}$

21 Souhag

1 (1) ∈ (2) 0.13 (3) 8.067
(4) 98700 (5) ⊂ (6) >
(7) 3360 (8) 3 (9) $\frac{7}{6}$
(10) 9.1 (11) 4 (12) 3
(13) = (14) $\frac{1}{100}$

2 (15) $\frac{5}{11}$ (16) a diameter (17) 1
(18) $\frac{13}{6}$ (19) a diameter (20) 343.513
(21) {1 , 2 , 3 , 4} (22) {5}

3 (23) [a] {1 , 2 , 3 , 4 , 5} [b] {2}
[c] {3 , 4 , 6} [d] {5 , 1}
(24) The price = 2.25 × 25 = 56.25 pounds.
(25)



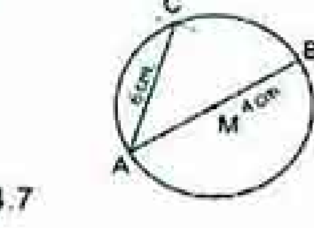
(26) [a] $\frac{4}{11}$ [b] $\frac{2}{11}$

22 Qena

1 (1) 452.6 (2) a diameter
(3) $\frac{6}{7}$ (4) 77.977 , 77.98
(5) 15.552 (6) B (7) 0.48
(8) 0 (9) 1 (10) 3

2 (11) 1 (12) 0.018 (13) $\not\subset$
(14) $\frac{1}{5}$ (15) 6.238 (16) U
(17) > (18) 7 (19) $\in$
(20) finite (21) 3 (22) $\frac{3}{8}$
(23) 740 (24) 2 (25) 4.04
(26) A

3 (27)



(28) 4.7

23 Luxor

1 (1) 7 (2) 76.52 (3) >
(4) 574.8 (5) diameter (6) $\subset$
(7) $\frac{4}{15}$ (8) 53.71 (9) {3}
(10) 3 (11) 0.03 (12) $\in$
(13) $\frac{8}{5}$ (14) {2}

2 (15) 3.2125 , 3.213
(16) inside (17) $\frac{1}{2}$
(18) 0.1678 (19) {2 , 3 , 5 , 7}
(20) 4 (21) 1.2 (22) $\emptyset$

3 (23) 8.379 , 8.38
(24) [a] $\frac{3}{6} = \frac{1}{2}$ [b] $\frac{0}{6} = 0$
(25) [a] {4} [b] {0 , 1 , 2 , 6 , 8}
(26)

24 Aswan

1 (1) 4.76 (2) $\emptyset$ (3) <
(4) 9820 (5) 9 (6) $\frac{1}{6}$
(7) 0.58 (8) X (9) 2
(10) $\not\subset$ (11) 7 (12) 3
(13) 1 (14) 4

2 (15) a diameter (16) {2 , 5 , 7} (17) $\frac{1}{6}$
(18) 2 (19) 3 (20) 1
(21) 180 (22) 350

3 (23) [a] $\frac{3}{15} = \frac{1}{5}$ [b] $\frac{10}{15} = \frac{2}{3}$
(24)

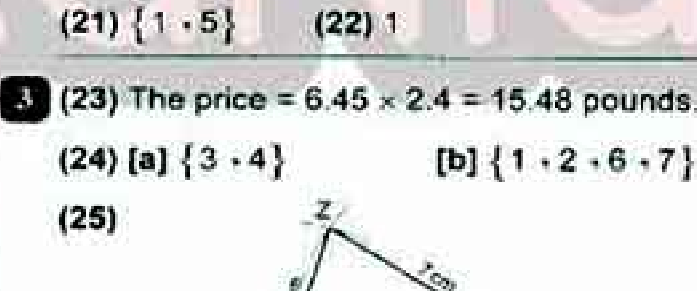
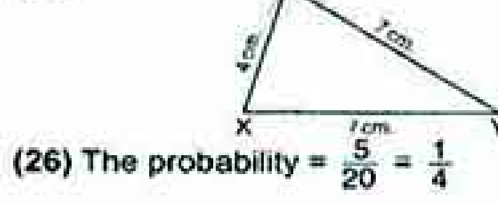
(25) The price = 2.25 × 5 = 11.25 pounds.
(26) [a] {2 , 3 , 4 , 6} [b] {2 , 3}

25 South Sinai

1 (1) 9870 (2) hundredth (3) 2
(4) diameter (5) 54 (6) $\emptyset$
(7) 23.348 (8) X (9) 3
(10) $\subset$ (11) 0.753 (12) >
(13) 10.9 (14) 2

2 (15) 24 (16) $\frac{2}{15}$ (17) 2
(18) {1} (19) 5 (20) a diameter
(21) {1 , 5} (22) 1

3 (23) The price = 6.45 × 2.4 = 15.48 pounds.
(24) [a] {3 , 4} [b] {1 , 2 , 6 , 7}
(25)

(26) The probability = $\frac{5}{20} = \frac{1}{4}$

NOTES